"What Does She See In Him?": The Effect of Sharing On the Choice of Spouse

By Douglas W. Allen*

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All husbands and wives share in the spoils of marriage. Sharing makes each partner a residual claimant and encourages spouses to provide marital inputs. However, because each spouse is only a partial residual claimant each may be inclined to provide a "suboptimal" level of marital inputs. The choice of spouse influences the level of distortion, and under some circumstances the efficient mating is between individuals of equal value.

Douglas W. Allen, Department of Economics, Simon Fraser University,
Burnaby, B.C., Canada, V5A 1S6

> People tend to end up choosing partners of approximately their own social worth. Romantic choices appear to be a delicate compromise between one's desire to capture an ideal partner and one's realization that he must eventually settle for what he deserves.
>
> Walster, et al. [1978, p. 176]

I. Introduction

The literature on marriage, though for a long time exclusively concerned with analyzing the role of comparative advantage between husbands and wives, has begun to examine the institutional details that make a marriage different from other living arrangements such as those involving roommates and live-in servants. To this end, most of the work has focused on the role of the state in marriage. Generally speaking, these papers have argued that a marriage generates potentially large transaction costs, and that state regulation of *some* aspects of marriage is an economical method of reducing these costs. In the same spirit this paper examines the role of sharing in marriage. Sharing is common to all marriages and yet is not imposed by any third party. Sharing in marriage, as with sharing elsewhere, affects the behavior of those involved. In particular, it changes the incentives to provide inputs towards producing marital goods. The resulting change in behavior alters the value of potential marriages between different people, and therefore, the act of sharing influences the choice of spouse.

The issue of sharing is irrelevant in zero transaction cost household production models of marriage. When transaction costs are unimportant, any contract can achieve the same result, and so a marriage can easily be thought of as "a two person firm with either member being the 'entrepreneur' who 'hires' the other at [some] salary". Yet, if the choice of contract between a husband and wife was irrelevant, we should occasionally observe spouses hiring each other the way one hires a maid, gardener, cook, babysitter, gigolo or prostitute. That we do not, that we observe only sharing within a marriage, suggests that transaction costs are not zero between spouses, and that sharing creates net benefits over other potential

contracts between a husband and wife. In marriage, the Coase theorem doesn't hold.

But is marriage not a case where transaction costs should be small? The literature on state intervention in marriage has argued that marriage can pose huge transaction costs. When a wife faces the threat of her husband leaving her after she has financed a medical degree, she takes actions to protect herself. When potential mates court one another they invest great amounts towards measuring the others attributes. When divorce laws change that put one gender at risk of exploitation, private methods of protection, such as postponing the age at marriage, occur. Becker and Murphy even argue that transaction costs can arise over dealings with immature, poorly funded, or even unborn children. In each case transaction costs arise from efforts to prevent large involuntary transfers of wealth from one spouse to the other. Although the legal institution and formal status of marriage may be designed to take these kinds of transaction costs into account, the state is unable to mitigate the costs that arise over monitoring the day to day actions of each spouse. I argue that the share contract is used to police the vast and often small decisions that a husband and wife continuously make.

In most marriage activities it is very costly for one partner to determine what the other has done or is doing. This difficulty arises because no one is omniscient and marital outcomes are influenced by husband, wife, and chance. The separate inputs supplied by each for a clean house, a financial plan, a conversation, a child, and other marital activities are all but impossible to measure by the other because random variability distorts outcomes and prevents each partner from attributing outcomes to the other's inputs. Though observing a misbehaving child might rouse one's suspicions that the level or type of parental discipline has been inappropriate, this need not be the case since some children are naturally more disobedient than others, and the same child is sometimes docile and sometimes not. If a wife comes home from work and finds the house a mess, is this because the husband shirked his duty, or because "the phone just never stopped ringing". If a husband finds a

dress receipt for $250, is he to believe his wife when she tells him that "everything else looked terrible, it was marked down 70 percent, and besides, I bought it ages ago anyway." It's possible that the store had only one item in the wife's size and favorite color, and so it is almost impossible to prove her real motivation. Marriage is characterized by a countless number of situations for which the measurement of marginal products is difficult (is the husband a bad cook, or does the oven really have problems?), and direct payment for services rendered is too easily exploited. Although with any given activity it might be feasible to distinguish a spouse's action from bad luck, given the multitude of minor decisions in marriage it does not pay to measure marital inputs for all activities.

Although gains to cohabitation exist, the problems involved with each spouse monitoring the other prohibit marriages from resembling fixed wage or rental contracts. For wage or rental contracts to be feasible, measurement costs must not overwhelm the gains from concentrating ownership. In marriage, however, the measurement costs for wage or rental agreements seem enormous. Living together involves a myriad of minor tasks, each one often performed alone, and each chore with many margins that could easily be used to one's advantage.

Husbands and wives, though they submit to binding rules and are attracted to marriage to achieve the gains it allows, are still private maximizers. If a selfish individual can gain at the expense of another without getting caught or penalized, he/she will do so. Marriage vows, choosing a spouse that you love and who loves you, state laws regulating marriage and divorce, and moral and social pressure, are all attempts to mitigate selfish behavior in marriage, and I do not deny their importance — I simply wish to add sharing to the list. As a result of individual maximization, any spouse hired on a wage basis would take advantage of the other by providing fewer inputs to the marriage than is optimal. Sharing reduces the losses caused by the improper input mix.

With sharing, each partner is a partial residual claimant and each polices his or her own behavior, although not to the extent of a complete owner. Since each

spouse's marginal decision to participate in marital activity is distorted, it is not possible to obtain the entire gains from trade realized in a zero transaction cost world. However, this loss is less than what would occur if the marriage resembled a wage contract or some similar arrangement that required direct measurement. A share contract reduces the loss resulting from neglected margins by creating an incentive for each spouse to curb their exploitative behavior.

In this paper I assume that sharing arises to best exploit marital gains from trade. *Taking sharing as given*, I argue that the usual constraints faced by young western couples leads to an optimal share of fifty – fifty. As a result, the model is consistent with the stylized fact that individuals usually marry others about as attractive, intelligent, educated, and socially desirable as themselves and subsequently share equally in the fruits and disasters of their union. Although people tend to avoid marrying others that have less to offer than themselves, the model indicates when contributions in marriage will not be equal and when spouses will not split fifty – fifty. The share model adds to Becker's explanation for divorce, and explains some other stylized facts of marriage.

II. Determining The Optimal Shares

The Model

Given that husbands and wives share, the shares of household output must be determined. In both the real world and the next section, many partner combinations are possible. However, in this section a simple model is developed that determines an optimal share for *any* given couple; that is, the share that would arise for a random couple cast ashore on a desert island. As one might expect, for any given pairing, the optimal share depends on the relative productivities of each spouse, their responsiveness to changes in the share, and their next best alternatives — no single best share generally exists. However, it is necessary to examine this case before introducing competition among partners.

To examine this problem, I make the following assumptions:

(1) The actual share of output is observed at zero cost by both parties;

(2) Three goods exist: one shared (marital) good and two separate goods;

(3) There are no lump sum transfers;

(4) Inputs are endowed and divisible, with the endowment of inputs measured at zero cost prior to marriage, but the actual supply of inputs not observable in production; and (required for section 2.2),

(5) The distributions of males and females, by quality, are identical.

In keeping with Becker's terminology related to divorce, the marital good is denoted "Z". The other goods are called separate goods and denoted "S^h" for the husband and "S^w" for the wife. The marital good requires both inputs, and is shared for the reasons just mentioned — wage or rental contracts are too easily exploited. By assumption, though, each partner knows *ex post* their own and their partner's actual consumption patterns. The marital good captures the gains from marriage — people get married to consume "Z". The separate goods on the other hand, reflect an individual's available options when single. They are produced and consumed alone.

Perhaps an example will clarify the definition of a marital good. Suppose a husband and wife share (among a thousand other things) a car and agree to split its services 60 – 40. Each person provides difficult to measure inputs like checking the oil, driving safely, not riding the clutch, keeping the car clean, avoiding gravel roads, not slamming the door, and so on. What one spouse actually does with the car is unknown to the other and may never be known since any failure can be attributed to several sources, ranging from the manufacturer and vandals to children and poor luck. However, it may be easy to determine which partner uses the car the most, and indeed, whether one received 60 percent or not. Many goods in a marriage, such as children, a house, an investment, a meal, or a degree are such that the actual division of output is known, while the level of inputs provided

by each for production are not. Goods that satisfy this condition are considered marital goods.

The production functions for these goods are given in equations (1) — (2).

$$Z = z(w, h, \alpha) + \epsilon \tag{1}$$

$$S^h = s^h(\overline{H} - h) + \epsilon \quad \text{and} \quad S^w = s^w(\overline{W} - w) + \epsilon \tag{2}$$

Where $\overline{W}$ and $\overline{H}$ are the fixed, endowed levels of productive inputs for the husband and wife, respectively; h and w are the levels of inputs devoted towards producing the marital good; ϵ, is a random error distributed over $(-\infty, \infty)$ with zero mean and constant variance; and α is a shift parameter for the wife's marginal product. By assumption, all input endowments can be measured prior to the marriage, and are fungible — production is independent of personality.

I assume that each spouse is risk neutral, and is concerned only with the total amount of their *own* consumption. Therefore, each individual objective is to maximize his or her own expected wealth, given by equations (3) and (4).

$$E(W^w) = E\Big[q[z(w, h, \alpha) + \epsilon] + s^w(\overline{W} - w) + \epsilon\Big] \tag{3}$$

$$E(W^h) = E\Big[(1 - q)[z(w, h, \alpha) + \epsilon] + s^h(\overline{H} - h) + \epsilon\Big] \tag{4}$$

Here q is the share of marital good that goes to the wife. The solutions $\hat{w} = f(q, \overline{W}, \overline{H}, \alpha)$ and $\hat{h} = g(q, \overline{H}, \overline{W}, \alpha)$, come from maximizing expected private wealth and they satisfy:

$$q z_w(\hat{w}, \hat{h}) - s^w_w(\hat{w}) = 0 \tag{5}$$

$$(1 - q) z_h(\hat{w}, \hat{h}) - s^h_h(\hat{h}) = 0 \tag{6}$$

From equations (5) and (6) it is clear that if the wife gets all the marital good ($q = 1$), then she divides her inputs between Z and S^w, while the husband participates only in the production of S^h, (i.e., $S^h = s^h(\overline{H})$). On the other hand, if q=0,

the husband supplies inputs for both goods, while the woman neglects her marital role. If the share to both the husband and wife is greater than zero, then both participate in producing the marital good.

In terms of obtaining a benchmark, it is worth looking at the cooperative solution (the zero transaction cost solution). Here, the objective is to maximize total expected wealth. Therefore,

$$\text{E(Wealth)} = E\Big[W^h + W^w\Big] \tag{7}$$

And w^* and h^* satisfy:

$$z_w(w^*, h^*) - s_w^w(w^*) = 0 \tag{8}$$

$$z_h(w^*, h^*) - s_h^h(h^*) = 0 \tag{9}$$

Equations (8) and (9) state that for each individual the marginal product of the separate good and the marital good must be equal.

If husband and wife maximize joint total wealth, h^* and w^* are used to produce the marital good and $(\overline{H} - h^*)$ and $(\overline{W} - w^*)$ are devoted to each respective separate good. If each maximizes his or her individual output, then $\hat{w}$ and $\hat{h}$ are used to produce the marital good. It must be the case that $\hat{w}, \hat{h}$ are less than w^*, h^* and, therefore, that the marginal product of each spouse is higher for the marital good than for the separate good when each spouse consider's only his or her own welfare. The share contract is chosen to avoid expensive monitoring efforts, but the failure to completely compensate both parties also leads to dissipation. Figure 1 gives a geometric interpretation of the problem at hand.

The total deadweight cost associated with a share of q to the wife equals the sum of the shaded areas. The marginal product curves z_w, z_h are drawn assuming each spouse supplies the optimal inputs h^*, w^*. The curves $qz_w, (1-q)z_h$ are drawn assuming each spouse supplies the inputs $\hat{w}, \hat{h}$. This deadweight cost can be formally described as,

$$DWC = z(h(0), w(1), \alpha) - z(h(q), w(q), \alpha) + s^h(\overline{H} - h(0)) \\ - s^h(\overline{H} - h(q)) + s^w(\overline{W} - w(1)) - s^w(\overline{W} - w(q)) \tag{10}$$

Every potential share determines an input mix different from h^*, w^*, and therefore, a different deadweight cost. Keeping in mind we are considering only a random couple, they would choose "q" such that the DWC is minimized. The equilibrium share is the one that equates the marginal DWC for each of the two inputs. That is, the share that minimizes the DWC is the one that equates the two distances AB and CD (in Figure 1 these distances are not equal, and therefore, the DWC drawn is not the minimum one). Assuming the sufficient second order conditions hold at the minimum, the implicit function theorem implies the solution $q = q^*(\alpha, \overline{W}, \overline{H})$ exists, where α is interpreted as a shift parameter of the woman's marginal product function for the marital good, and measures the *relative* marital abilities of the two individuals in the production of the marital good, Z. The function q^* takes account of each individual's shirking in the production of the marital good, and yields the share that *minimizes* the deadweight costs. In other words, q^* maximizes the value of a given marriage.

The share q^* depends on the productive characteristics of each spouse. Many sharing rules seem possible; that is, a random couple, tossed alone on a desert island could end up with almost any share. In the next section I argue that competition, along with the assumptions made earlier, force individuals to choose an equally productive partner and share fifty – fifty.

Competition and Fifty – Fifty Sharing

What happens to the share q^* when the productivity of one spouse changes relative to the other; that is, what are the signs of the first and second derivatives of q^* with respect to α? When, as is assumed here, the input of one spouse influences the marginal product of the other (i.e., $z_{wh} \neq 0$), then no unambiguous comparative

static results are forthcoming. The rate of change of the share with respect to a change in productivity is ambiguous. Thus, generally,

$$\partial q^*/\partial \alpha \quad \begin{matrix} \geq \\ < \end{matrix} \quad 0 \qquad \text{and} \qquad \partial^2 q^*/\partial \alpha^2 \quad \begin{matrix} \geq \\ < \end{matrix} \quad 0$$

Unlike most situations in economics, this ambiguous second derivative leads to the interesting prediction that many marriages will share fifty – fifty. When each individual makes an equal contribution, the optimal share is fifty –fifty. When each spouse makes an unequal contribution the optimal shares will be unequal and *will not* equal the marginal products of each spouse. The only time q^* coincides with the share that appropriately compensates each party according to their marginal product, is when each is equally productive and shares equally. This bears repeating: in most cases when, for example, a wife provides 60 percent of the inputs for marriage, 60 percent of the output is unlikely to be the optimal share. Further, if her contribution increases to 75 percent, the divergence between her effort and contribution also increases.

Changes in the productivity of one spouse disproportionately change the share that minimizes the costs of sharing. Since it is assumed that the productivity of W and H are known before the marriage, *and* since no one will enter a marriage expecting to receive less than what he or she can receive elsewhere, a marriage between two vastly different people must have shares that fail to minimize the deadweight costs. More importantly, the larger the difference between potential mates, the more expensive the proposed marriage becomes in terms of DWC. If each spouse receives a share that adequately compensates him or her (i.e., according to their marginal contribution) then the deadweight costs are not minimized, and if the deadweight costs are not minimized one partner will always be able to do better in another marriage. Thus competition among potential mates will force individuals to choose a spouse with equal productivity over the life of the marriage.

A marriage of two vastly different people may be expensive, but it may seem conceivable that an under-rewarded spouse is still better off than he or she is with

a partner whose ability equals his or her own. For example, suppose a highly productive woman marries a man of minor means. Further, suppose the woman's contribution is 87 percent and the man's 13 percent; however, the optimal shares are 90 percent and 10 percent respectively. Although the man's share is "too small", could his actual return be greater than what he would receive in a fifty – fifty marriage with another woman equal to himself? It could be, but if it were, would this marriage exist? The answer is no. With constant returns to scale, the total gross value of all marital goods is highest with equal matching, and since the minimum DWC increases with increased differences in productivity, the total net value of all marital goods will be lower when dissimilar people marry. Competition among potential spouses forces individuals to marry people with the same productivity, so that the shares are .5 and total household output is maximized. Since the pattern of marriages is independent of personality and technology, there are no utility or technical reasons for diverse couples to join or remain together. As long as diverse partners remain together the total value of all marriages is not maximized. Competition for these unexploited gains from trade will force couples to marry others of similar talent levels.

Unequal Sharing

The result just reached will not hold for all share contracts. A crucial assumption required for the fifty – fifty result is that no lump sum transfers occur. This absence of side payments forces the marginal and average shares to be equal. The marriage contract could, however, have taken the following linear form: $X + q\%$; that is, some amount of goods may be initially set aside for one particular spouse. This completely alleviates the problem of coinciding contributions with minimum deadweight costs, since the lump sum payment can adjust for any shortfalls in compensation without interfering with marginal decisions. To the extent this happens with other sharing arrangements, shares other than fifty – fifty are expected. Thus, franchise agreements that have up front money, contingency arrangements that provide for expenses, and agricultural share contracts that also share input costs should not be expected to always have fifty – fifty sharing splits.

What is the intuitive explanation for assuming no transfers, and hence the fifty – fifty split? Consider the possibility of compensating a spouse with the "Z" good. Simply altering the share fails by the argument above. Just giving one spouse all of, say, the first Z produced and then sharing the rest fares worse because the giving spouse is taxed 100 percent on the first unit. Since one cannot identify marginal products, the giving spouse shirks a great deal. Transferring separate goods will not work either. Recall that these goods reflect "single" activities and are likely to be non-transferable (a Saturday morning golf game) or not valued by the other spouse. Furthermore, having the overpaid mate transfer separate assets implies less time and inputs devoted to the marital good. In short, once a couple is married, additional separate goods cannot be created without reducing the amount of marital good. Transfers prior to marriage would have solved the problem. However, it is likely that most young individuals marrying in the West will be too capital constrained. When transfers prior to marriage are possible, then it is possible for marriages to share in a proportion other than fifty – fifty.

An Explanation For Divorce

The fifty – fifty sharing model provides an explanation for why divorce is likely to occur when realizations deviate from expectations. In their seminal paper on marital instability Becker et al. [1977] argue that divorce largely results from mismatches caused by uncertainty. Much of their theoretical analysis considers variables that may influence either the expected gain from marriage or the chance of a mismatch. They hypothesize that when the expected gain is low or the chance of a mismatch is high divorce is more likely. For example,

> men with relatively high earnings potential gain more from marriage than men with low earnings potential not only because of the higher level of their income but also because of greater gains from specialization within marriage, since their mates have a comparative advantage in specializing in non-market investments.
>
> Becker et al. [1977, p. 1146]

And,

> If a matching trait is rare — such as very high or very low intelligence or an uncommon race or religion — extensive search costs would be greater because

> persons with average traits are more readily encountered in the marriage market. ... Consequently, the probability of mismatches, and thus of marital dissolutions, would be greater with rare traits.
>
> Becker et al. [1977, p. 1150]

Becker et al. point out that a change in circumstance that favors one partner relative to the other does not immediately result in divorce, since it is possible to recontract. Divorce occurs only when the total wealth of remaining together is lower than the total wealth of the individuals when separated. In order for Becker's examples to work, however, a new and large unexpected alternative must present itself. The natural interpretation appears to be that as time passes, information regarding alternative spouses and occupations outside the marriage is gathered at near zero cost. This, although possible, seems unlikely when marriage tends to restrict one's ability to search for marital-like pleasures elsewhere. This rise in search costs makes it difficult to find a better mate. In addition, the degree of sunk investments by both spouses tends to increase over time, thereby reducing the incentive to find a new alternative arrangement.

The sharing theory presented above allows for a more plausible reason for marriage failure. It is not that the value of alternative partners increases, but that the value of marriage to the existing partners may decrease independently of others. According to this analysis, the key feature to predicting different divorce rates among broad classes of individuals still centers on mismatches; however, no one marries expecting a mismatch. Problems arise when either spouse turns out differently than was expected causing the value of the marriage to fall. An unexpected change in one spouse may alter the efficiency of the marriage, even though the alternatives have not changed. Recontracting is usually a poor option for the same reasons why lump sum transfers are difficult. Further, recontracting the share will necessarily lead to a marriage where the gains from the marriage are not fully exploited or the more productive spouse is under compensated. In either case breakdown occurs. Thus inter-racial and inter-religious marriages may have higher divorce rates because estimating marital productivities is more difficult, rather than because the chance of

a better mate coming along is higher. The analysis presented here is consistent with Becker et al., but provides an additional mechanism for how uncertainty can lead to a dissolution.

III. Concluding Remarks

Nothing in this clinical treatment suggests that love and emotion are absent from marriages. Rather, in holding such things constant, this paper has only exploited a single, though I think important, aspect of marriage. It is often taken for granted that people share equally in marriage. Here I've argued that equal sharing is the result of transaction costs and the efforts to mitigate them.

This paper contains no empirical evidence to support the model, but it does seem to conform to casual observation. Consider a high school romance, where anything more than skin deep attraction is seldom involved. Is it not well known that the head cheerleader always chooses the football captain over the president of the chess club? And how often does one hear the comment "I wonder what she sees in him" — implying that a superficial deficiency must be compensated for by some hidden redeeming feature. Also, the recent finding that men do less than half of the housework in two income families is also consistent. Consider these excerpts from the *Seattle Times*:

> Janice Hogan, head of the Family Social Sciences Department at the University of Minnesota ... [said] ... "There really is a trend toward men doing more of the housework ... women are doing less .... My conclusion is there is less work being done at home.... The reason for the current state of untidiness is simple: Men ... have not picked up the slack ... The result is a rather unequal division.
>
> [August 11, 1987, F]

It may appear unequal, but to the extent that men have higher returns in the workforce, *ceteris paribus*, than women (due to their higher utilization rate), housework will mostly be done by women in households where both spouses work outside the home. Where wives earn more than their husbands the household roles should reverse.

Not all people marry someone who is expected to be an equal partner. When parents take part in the selection of their child's spouse, a pre-marriage transfer may take place, which may suggest a reason for dowries and bride prices. In societies where these are available, marriages will tend to have unequal partners. As the age at one enters marriage increases, it seems likely that lump sum transfers become more likely, and so fewer of these marriages that are otherwise unequal should split fifty – fifty. Similarly second marriages should be less likely to split fifty – fifty since there is some possibility of a transfer, especially when children exist from a first marriage. So other shares are possible, but in general it seems that most first time Western marriages are likely to succumb to the forces of a fifty – fifty split.

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Footnotes

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1. See Allen [1990a], Becker and Murphy [1988], and Cohen [1987], for example.

2. Becker [1976, p. 216].

3. See Allen [forthcoming (c)] for statistical evidence that the Coase theorem does not hold in marriage.

4. Where chance is both random and its effect prohibitive to measure.

5. The input mix is sub-optimal in that it differs from what results from a joint wealth maximizing marriage. I define the loss of output from the incorrect input mix as the transaction costs of a particular union. This assumes that no direct monitoring takes place.

6. Eswaran and Kotwal [1985] justify the existence of sharecropping in agriculture on the same grounds. These transaction costs are not eliminated by the close proximity of one's spouse — keeping a close eye on the other is not always possible and very costly.

7. Although sharing results from the fact that many marital goods are consumed, to analyze the effect of sharing it is sufficient to look at an aggregate good. Among other things, this assumes that all marital outputs are affected in the same way by increases in the productivity of either spouse. For more on this, see Becker [1976, p. 208].

8. Each production function z, s^h, and s^w has constant returns to scale with positive and diminishing marginal products. The error term in the production functions allows for the possibility of transaction costs, since it prevents either spouse from determining inputs from output levels. For simplicity the error terms are all distributed the same. See Allen [forthcoming (b)] for a further explanation of the conditions for transaction costs.

9. The role of α becomes important in the next section. A change in α shifts the woman's marginal product, but leaves the man's unaffected (i.e., $z_{h\alpha} = 0$). There may, however, still be a cross effect between men and women. For example, $Z = \alpha z_1(w) + z_2(w, h)$, is a possible formulation. Further, a change in α has no subsequent effect on the wife's separate good.

10. If $h_i = h_j$, then $Z(w_i, h_i) = Z(w_i, h_j)$. That is, if Bob is equal in productivity with Bill, Jane would be indifferent between them.

11. Where subscripts denote partial derivatives.

12. There is some intuitive appeal to the outcome of h^* and w^*. After all, if a marriage cannot be viewed as a cooperative venture what can? In the model considered here, however, where measurement of performance is prohibitive, marriage is a non-cooperative game. If each person is concerned solely with his or her own consumption, then the level of sharing matters.

13. Where $h(0)$ means the amount of husband input into the marital good when $q = 0$.

14. Assuming $0 < q < 1$, the necessary condition for a minimum of DWC is,

$$\begin{aligned} 0 = &\Big[s_h^h(\overline{H} - h(q)) - z_h(h(q), w(1), \alpha)\Big] h_q \\ &+ \Big[s_w^w(\overline{W} - w(q)) - z_w(h(0), w(q), \alpha)\Big] w_q \end{aligned} \tag{11}$$

15. Substituting q^* into equation (11) of footnote 14 creates an identity, and therefore, the marginal effect of a change in α on q^* can be calculated. Then,

$$q_\alpha^* = z_{w\alpha} w_q / \Delta \quad \begin{matrix} \geq \\ < \end{matrix} \quad 0$$

where Δ is the determinant of the Hessian matrix and is positive by the second order conditions for a minimum. The second derivative is also ambiguous. If $z_{wh} = 0$ then $w_q > 0$, and therefore $\partial q^*/\partial\alpha > 0$; however, $\partial^2 q^*/\partial\alpha^2$ is still ambiguous. The fifty – fifty result depends on the ambiguity of this second derivative, not on the sign of the first derivative.

16. From equations (5) and (6), if $z_w = z_h, s_w^w = s_h^h$, and $\overline{H} = \overline{W}$, then $\hat{w} = \hat{h}$, and $q = (1-q)$. Therefore, $q = .5$. For this result only the marginal values of these functions need to be equal in equilibrium. It does not imply that the functional forms are identical.

17. From equation (10), and by the Envelope Theorem, we have:

$$\partial DWC/\partial\alpha = z_\alpha(h(0), w(1), \alpha) - z_\alpha(h(q), w(q), \alpha)$$

A first order Taylor series expansion of the second term around the point h(0), w(1) yields:

$$z_\alpha(h(q), w(q)) \simeq z_\alpha(h(0), w(1)) + z_{h\alpha}(0,1)[h(q) - h(0)] + z_{w\alpha}(0,1)[w(q) - w(1)] + z_{\alpha\alpha}[\alpha - \alpha]$$

But $z_{h\alpha} = 0$ since α only affects the woman's marginal product directly. Therefore, since $w(q) - w(1) < 0$ and $z_{w\alpha} > 0$ it follows that $\partial DWC/\partial\alpha > 0$. As one spouse increases in productivity relative to the other, the total DWC also increases. This makes sense. The reaction to a parametric change should be larger when both parties act as complete residual claimants than when they are only partially responsible.

18. For a trivial example, let $A = 4$, $B = 9$ be two males, and $C = 4$, $D = 9$ be two females. Let $Z = w^{1/2}h^{1/2}$. With matched marriages AC BD total output is 13, while with mismatched marriages AD BC total output is 12.

19. See footnote (17).

20. This refers to one's productivity over the entire life of the marriage. The reason for treating marriage as a one period, non-instantaneous game is because I am

interested in the choice of spouse. It seems reasonable to assume that this is the first step in getting married, and that therefore, all gains from trade are in the future. At any time during the marriage though, contributions will likely be unequal, and arrangements will be necessary to deal with any problems that arise. See Cohen (1987) on this point.

21. Some find this result objectionable, citing marriages where the talents of one partner far outstrip the other's. In anticipation of this objection, consider the following: first, expected contributions are equal, not necessarily the actual ones. Second, the result cannot be tested by observing a subset of a married couple's attributes. For example, the observation that in many societies men marry women who are "inferior" or "beneath" them would seem to refute the result here. What is usually meant though, is that the man be better educated, taller, or whatever. That is, men are required to have a certain set of attributes. The women will have other attributes, and these attributes are predicted to be of equal importance within the marriage, although perhaps they are not as important socially. In any case not all men can marry inferior women, since on average men and women have the same backgrounds. And, as I point out later, there are cases when unequal marriages are likely to occur.

22. I would argue that the switch to no-fault divorce lowered the cost of divorce in the face of increased work force participation by women. With both spouses planning to work outside of the home, measuring marital inputs becomes more difficult, and hence fewer matches will continue to meet their fifty – fifty goal.

23. For example, Farrell and Scotchmer [1988], in their introductory remarks on partnerships assert that marriage involves equal shares with no side payments: "Marriage is an equal sharing, and we avoid making spouses' payoffs depend on their outside opportunities" [p. 279].

24 An earlier version of the paper (available on request) attempted to exploit differences in state property laws to test the model here. Although the results

were consistent with the proposition that first-time marriage partners share equally, the data did not allow confirmation of several key assumptions, and so the results are not reported.

Figure 1

Optimal Allocation of Inputs in the Production of Marital Goods