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THE ECONOMICS OF MISBEHAVIOR AND LOVE IN MARRIAGE

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I. Introduction

Traditional economic theory treats families as a single unit with a combined "household" utility function. More recently, economists have recognized that a family can usefully be described by assuming that each member maximizes an individual utility function. Becker [2] models the

[1]I gratefully acknowledge the assistance of David James but accept full responsibility for errors or omissions in this paper.

process of mate selection by individuals and describes behavior of family members seeking to maximize output of family-produced commodities. Other authors investigate the role of individual bargaining in allocating household goods (Manser and Brown [7], McElroy and Horney [6]. Pollak [8] emphasizes the role of transaction costs in the decision to marry, likening marriage to the merger of private firms.

This paper extends the new theory of marriage, especially that developed by Becker, by examining the effect that sharing of family output has on individual family member incentives. This paper models techniques used by families to assure proper member behavior and, in particular, the role of love as an enforcement tool. The model suggests a number of testable implications which provide fertile ground for future research.

II. A Model of Family Allocation of Time

In the new theory of marriage, two individuals choose to marry if output produced by a couple exceeds that of the sum of individual outputs. More generally, a family (F) chooses to accept a mate (M) if the increase in production or utility from doing so exceeds the compensation to the mate plus appropriate transaction and enforcement costs. This formulation allows for extended families which arrange a marriage and expect the spouse (or spouses) to live with and contribute productive effort to the family.[2]

An individual can devote time to production of household goods, shared among family members, or can devote time to production of own goods, consumed only by the individual.[3] Household goods are produced using inputs of time from both M and F, $P=P(m_p,f_p)$.[4] The function P is measured in some common unit of value.[5] The share of the household good P allocated to M is given by s, the remainder of which goes to F. Positive but diminishing marginal value products of both time inputs is assumed, as is a diminishing marginal rate of substitution between time inputs.

Production of own goods is a function of individual time inputs. Y is the value of goods produced by F for F, $Y=Y(f_y)$, and X is the value of goods produced by M for M, $X=X(m_x)$. Positive but diminishing marginal value product is assumed for both functions.

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[2]Each spouse in a childless two-person marriage can be considered both "family" and "spouse". Such a situation raises some interesting questions about the symmetry of misbehavior, enforcement, and love.

[3]One good produced with an individual's time and consumed by an individual is leisure.

[4]More formally, inputs and outputs are each vectors representing the variety of uses of time and the variety of value-producing outputs.

[5]Becker and others use a production function where time and other inputs produce goods which are then combined into one composite household good. The use of value functions here allows time to be allocated to both individual and household goods and is equivalent to the indirect utility functions used by McElroy and Horney [6] and by Manser and Brown [7].

Value to the family is given by the following function:

(a) $V_f = (1-s)P + Y$

Assume the share s is determined by the family. For reasons evident later, let share s be a function of parameter z which the family actually chooses, s=s(z). The function has a maximum (s''<0) at s=1 and a minimum (s''>0) at s=0. For convenience, s=0 when z=0 and s=1 when z=1.[6] Alternatively, share may be determined from some bargaining process between M and F or may be determined by the market. In these latter two cases, s is exogenous, although the conclusions of the model are unaffected.

If F controls distribution of P and controls time allocations by M, F maximizes the above equation with respect to z, m_x, m_p, f_y, and f_p. The function is constrained by total time available to M and F and is constrained because F must assure that M receives income I at least equal to that available in another marriage,[7] $sP+X \geq I$. The constrained maximization equation for the family can be written as the following:

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[6]The cubic function $s(z)=-2z^3+3x^2$ satisfies these conditions as does the sine function and any number of B-splines of order two.

[7]The cost of divorce is not explicitly considered here. Either I is net of divorce cost or this is a calculation made before marriage. An additional note: the next best alternative for M may be to remain single, in which case I=X(M).

(b) $$V_f = (1-s)P + Y - \lambda_1(m_p+m_y-M) - \lambda_2(f_p+f_y-F) + \lambda_3(X+sP-I)$$

If the compensation constraint I is binding, M receives compensation equal to the best alternative and the maximization problem is solved using $\lambda_3>0$. Omitting the constraint equations, the first order conditions are the following:

(c) $$\frac{\partial V_f}{\partial s} = -\frac{\partial s_p}{\partial z} + \lambda_3 \frac{\partial s_p}{\partial z} = 0$$

(d) $$\frac{\partial V_f}{\partial m_x} = -\lambda_1 + \lambda_3 \frac{\partial X}{\partial m_x} = 0$$

(e) $$\frac{\partial V_f}{\partial m_p} = (1-s)\frac{\partial P}{\partial m_p} - \lambda_1 + \lambda_3(s)\frac{\partial P}{\partial m_p} = 0$$

(f) $$\frac{\partial V_f}{\partial f_y} = \frac{\partial Y}{\partial f_y} - \lambda_2 = 0$$

(g) $$\frac{\partial V_f}{\partial f_p} = (1-s)\frac{\partial P}{\partial f_p} - \lambda_2 + \lambda_3(s)\frac{\partial P}{\partial f_p} = 0$$

The multipliers λ_1 and λ_2 are the marginal values to F of additional time for M and F, respectively. That $\lambda_1<\lambda_2$ implies M's time is less valuable to the family than is F's time.[a] λ_3 is the marginal cost to F at equilibrium of an

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[a]Not surprisingly, implying that a family may be uninclined to spend resources on extending the life of a

increase in the alternative income I to M. Given that $\lambda_3>0$ and assuming s and P are positive, λ_3 must equal one. The marginal cost to F of an increase in I by one dollar is one dollar, the amount F's income falls.

A sufficiently large $\partial V_f/\partial f_p$ or small $\partial V_f/\partial f_x$ would induce F to devote all available time to production of household goods; "I simply have no time to myself." Similar conditions would make F require M to devote all time to household production.' Opposite conditions could induce F to give all time to own production.

Since $\lambda_3=1$, conditions (d) and (e) simplify to the following:

$$\text{(h)} \qquad -\lambda_1 + \frac{\partial X}{\partial m_x} = 0$$

$$\text{(i)} \qquad -\lambda_1 + \frac{\partial P}{\partial m_p} = 0$$

These conditions in turn imply the following:

$$\text{(j)} \qquad -\frac{\frac{\partial X}{\partial m_x}}{\frac{\partial P}{\partial m_p}} = -1$$

The left side of this equation is the slope of an isovalue curve from the function $V_f(m_x, m_p, \ldots) = V_f^0$,

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mate compared to extending F's life. This would include the whole range of health care expenditures.

'Becker [2, p. 15] outlines in detail the conditions which encourage this total household specialization.

holding other inputs to value constant. At equilibrium, the slope of this functions equals the slope of M's time constraint. If M can costlessly substitute time between the two activities, the budget line's slope is -1.

Figure 1 shows that the graphical solution is similar to

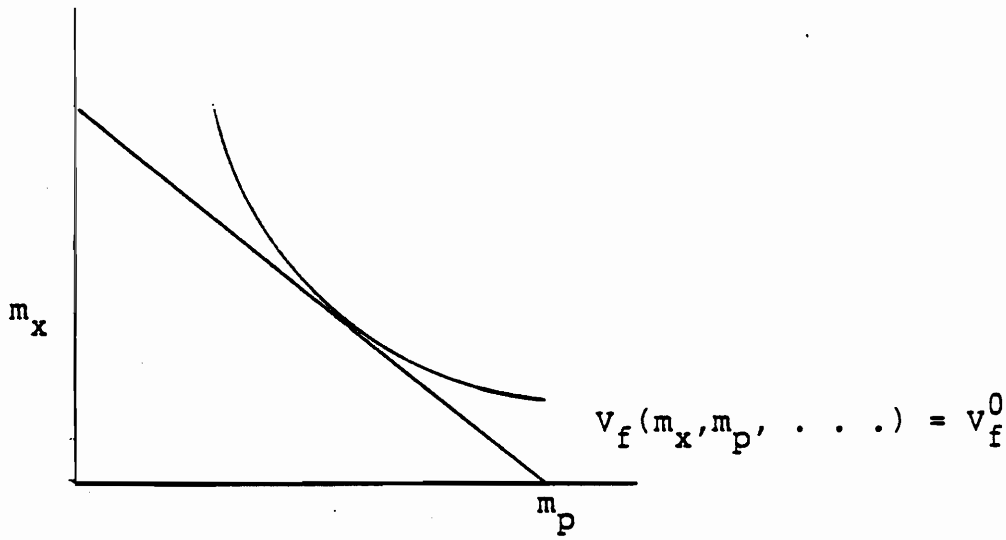

Figure 1. Value Maximization for F

III. If the Income Constraint is not Binding

If F is compelled to pay M the income M would receive outside the marriage, the income constraint (I) is binding and the maximization equation is solved using $\lambda_3>0$. The alternative is when the income constraint is not binding. The alternative income is lower than the compensation F chooses to allow M to receive. In this case, F's maximization is solved using $\lambda_3=0$. Omitting the constraint equations, the first order conditions become the following:

(k) $\frac{\partial V_f}{\partial s} = - \frac{\partial s_p}{\partial z} = 0$

(l) $\frac{\partial V_f}{\partial m_x} = -\lambda_1 = 0$

(m) $\frac{\partial V_f}{\partial m_p} = (1-s)\frac{\partial P}{\partial m_p} - \lambda_1 = 0$

(n) $\frac{\partial V_f}{\partial f_y} = \frac{\partial Y}{\partial f_y} - \lambda_2 = 0$

(o) $\frac{\partial V_f}{\partial f_p} = (1-s)\frac{\partial P}{\partial f_p} - \lambda_2 = 0$

The results of these conditions might be described as the pure exploitation case. Assuming positive output of the household good, condition (k) is true when $s'=0$.[10] For a maximum, the second derivative of condition (k) must be less than zero, implying that $s''>0$. This is true when $z=0$ and $s=0$. In other words, M receives no share of household goods. Because $\lambda_1=0$, F requires that M work until the marginal value of additional time equals zero. Combining conditions (l) and (m) yields $\partial P/\partial m_p=0$, showing that F uses M's time until additional time yields no additional household goods. M is permitted to use any remaining time for production of own goods.

[10]Because the special function $s(z)$ is used, it is possible to determine whether s is at a maximum or a minimum.

M would not voluntarily choose this alternative since M receives greater income by remaining single. If single, M can devote all time to production of own goods, rather than using some time for production of household goods of which no share is received. This alternative only appears, therefore, in a situation where single living does not occur.

By contrast, the family prefers this alternative. The family is not constrained by M's compensation. In fact, the family gains to the extent it can reduce the available alternative income to M, especially if the alternative income is eliminated as a constraint. We would expect cultures with this system to be characterized by marriages arranged without the consent of at least one spouse, household labor strictly enforced by the family, prohibition of voluntary divorce, and prohibition of voluntary single living.

IV. Conflicting Incentives

In the theory of firm,[11] individuals earn higher income by allowing themselves to be organized by an entrepreneur in

[11]The vast literature on this subject is represented by Alchian and Demsetz [1]. Applied voluntary organizations, the literature is summarized by Sandler and Tschirhart [9]. Cheung [4] models family size and marriage contracts using the theory of the firm. Most similar to the family production here, Cheung [5] also examines the problem of conflicting incentives in share tenancy contracts.

a way that reduces otherwise considerable transaction costs. Such an arrangement also allows exploitation of economies of scale and promotes gains from specialization. One important restraint on the gain from forming a firm is the cost of monitoring and enforcing appropriate behavior by workers. Overall, workers have higher income because they are organized in firms, but once organized in firms, each worker has an incentive to shirk assigned responsibilities and so increase individual utility. Managers use a variety of techniques to assure appropriate worker behavior.

Because a family member only receives a share[12] of the output produced with that individual's time, the family member may have different preferences than those of the family.[13] If M could choose own time allocations freely, M would maximize the following function with respect to m_x and m_p. M is assumed to take the share of household goods s as given.

$$(p) \quad V_m = sP + X - \lambda(m_p+m_y-M)$$

Omitting the constraint equations, the first order conditions are the following:

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[12]The case of household public goods, which are consumed equally and fully by all family members is considered later.

[13]Becker [2, p. 15] acknowledges this problem, but his model emphasizes other aspects than enforcement of appropriate behavior.

$$(q) \quad \frac{\partial V_m}{\partial m_x} = \frac{\partial X}{\partial m_x} - \lambda = 0$$

$$(r) \quad \frac{\partial V_m}{\partial m_p} = s\frac{\partial P}{\partial m_p} - \lambda = 0$$

The marginal value to M of additional time for M is λ. Notice that λ is in general not equal to λ_1 from maximization for F. The value of M's time is different for M than for F.

The above conditions in turn imply the following:

$$(s) \quad -\frac{\dfrac{\partial X}{\partial m_x}}{s\,\dfrac{\partial P}{\partial m_p}} = -1$$

Once again, the left side of this equation is the slope of an isovalue curve from the function $V_m(m_x,m_p) = V_m^0$. At equilibrium, the slope of this functions equals the slope of M's time constraint. If M can costlessly substitute time between the two activities, the budget line's slope is -1.

This equation would be identical to maximization for F were it not for the presence of the share term s. The equilibrium marginal rate of substitution between time inputs is different for M because M receives only a share of the household good P. M chooses less time for household production than is preferred by the family. In order to achieve a slope equal to (minus) one in condition (s), the numerator must be smaller than for condition (j), implying smaller marginal value product of own production time and so more time given to own production. Likewise, the marginal value product of time for household must be larger for condition (s) than for (j), so less time is given to household production.

The time inputs of M preferred by M are different than those preferred by F for any distribution of household goods other than giving all of them to M, (s=1). This suggests that there is a temptation to shirk regardless of the agreed distribution of household goods. The temptation will persist despite changes in the distribution. Thus, a change in distribution cannot be used to "bribe" M into behaving properly.

Figure 2 compares the isovalue graphs for M and F.

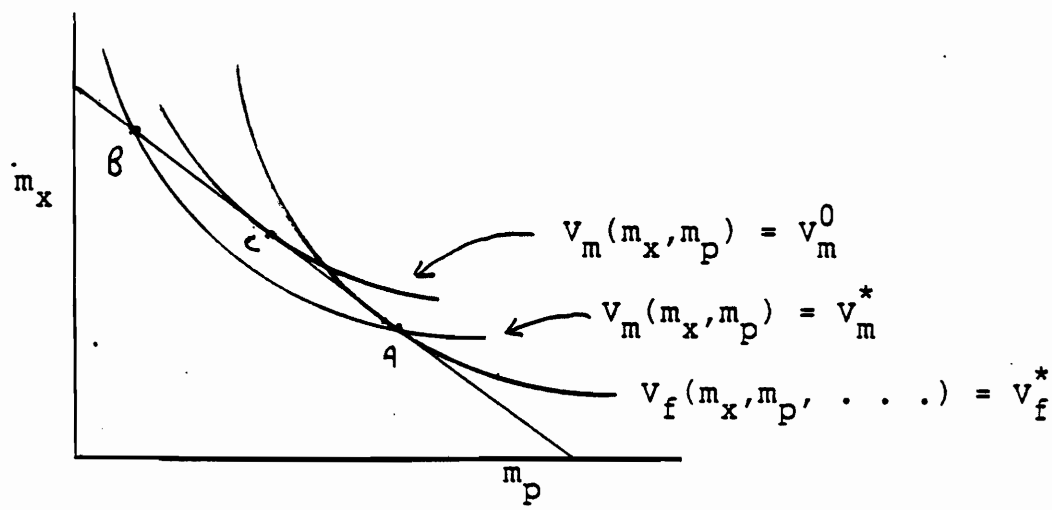

Figure 2. Comparing M and F Choices

Notice that an isovalue curve for M passing through F's equilibrium point A has a slope equal to -s. This is shown simply by multiplying both sides of equation (s) by s and using the amounts of m_x and m_p which maximize value for F.

As the share given to M approaches one, the difference between optimal choices for M and F are reduced. Thus, as the mate's share of household goods gets larger, the mate is less likely to misbehave. Here misbehavior has no moral content and only implies behavior different from what the family prefers. If household goods are shared equally among family members, this implies that members of larger households have greater temptation to misbehave. Large families are therefore more likely to impose rigorous enforcement methods rather than permitting voluntary compliance with desired behavior.[14]

The difference in preferences between time inputs chosen by F for M and those chosen by M for M is also influenced by the convexity of the isovalue function, the degree to which the marginal rate of substitution between time inputs diminishes. The equilibrium for M (point C) is always between points A and C in Figure 2. As the isovalue functions become more convex, the range of equilibrium points for M, and thus the difference between equilibrium points for M and F, decreases.[15]

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[14]Both Becker [2, p. 32] and Pollak [8] discuss the cost of organizing a larger household.

[15]This assumes no unusual functional forms. A sufficient condition for the conclusion to hold is homotheticity--functions lie along straight-line expansion paths from the origin. Isovalue functions for M ordinarily

The important component determining convexity of the isovalue function is the degree to which M can substitute time inputs between own and household production. If time inputs are easily substituted, the isovalue function has a relatively flat slope, and M has relatively greater incentive to misbehave.

For example, M's time is readily substitutable if it is used to earn wages, in turn used to purchase either own or household goods. In this case, it is easy to substitute time (income) between own and household goods. M is tempted to keep earned income since M only gets back a share of income given to the production of household goods. The implication here is that families find it more costly to enforce appropriate member behavior when production is characterized by widespread use of wage labor outside the household.

Individuals are less tempted to misbehave if own production time is difficult to substitute for household production time. If own and household production are highly specialized, substitution is difficult. Specialized here means sharply diminishing marginal value products of one or more of the time inputs. This is more likely when own and household activities are distinctly different.

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should have the same shape as those that F chooses for M, but be displaced by the amount of the share.

V. Household Public Goods

Some goods produced by the family may be "public" goods in that they are consumed jointly by family members. Consumption by one member does not affect the quantity available for others. These goods are termed household public goods because they are not available outside the family.

A family's house has characteristics of such a good. Once built (and ignoring congestion) the building's shelter is available to all members. Other examples include family entertainment (television?), some of the joys of children, education, and security.

Introduction of household public goods only slightly alters the model's implications. Let P* be the value to the family of the household public good (excluding M). P* is the appropriate sum of the demand curves of family members. If the value to each family member is identical, P*=nP where n is family size (excluding M). The maximization problem for F is solved replacing (1-s)P with P* and replacing sP with P. First order conditions (d) and (e) become the following:

$$\text{(t)} \quad -\lambda_1 + \lambda_3\frac{\partial X}{\partial m_p} = 0$$

$$\text{(u)} \quad n\frac{\partial P}{\partial m_p} - \lambda_1 + \lambda_3\frac{\partial P}{\partial m_p} = 0$$

These conditions in turn simplify to the following:

(v)
$$- \frac{\frac{\partial X}{\partial m_p}}{\frac{n}{\lambda_3} \frac{\partial P}{\partial m_p} + \frac{\partial P}{\partial m_p}} = -1$$

Once again, F equates the marginal rate of substitution between time inputs for M to the slope of the time budget line. Because the value of the household public good is multiplied by the number of family members, the household public good is relatively more valuable than the ordinary household good. For this reason, the family wants M to devote more time to household production than in the simple case. Given values in the simple case, the denominator in condition (v) is larger than in condition (j). To achieve equilibrium, the numerator must become larger and the denominator must be smaller. This occurs if M's time is transferred from own to household production.

As in the simple case, M has incentive to misbehave. Solving M's maximization using P for sP and manipulating the first order conditions yields the following:

(w)
$$- \frac{\frac{\partial X}{\partial m_p}}{\frac{\partial P}{\partial m_p}} = -1$$

Again, the values for equilibrium imply that M would choose less time for production of household goods than preferred by the family in condition (v). This is not a surprising result. M still receives only a fraction $(1/n)P^*$ of the family's value of the household public good and so is less inclined to spend time producing it than the family prefers.

This is not to say that the presence of household public goods has no effect on the family. In fact, families where household public goods are important should have more members than other families. Under ordinary production, the marginal value to the family of an additional member is the production of that member less opportunity cost. With household public goods, the value of an additional member is the production of that member multiplied by the number of members less the same opportunity cost as in the ordinary case. Since additional family members are relatively more valuable, family should be larger.[16]

Although the family has incentive to increase family size in the presence of household goods, an increase in family size also increases the tendency of the mate to misbehave. A larger family means a greater difference between M's and F's preferences. As Pollak recognizes, an important constraint on family size is the increasing cost of enforcing appropriate family member behavior.

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[16]Pollak [8] shows how families are larger when organizing family production is relatively easy. Becker [2] explains how family size is influenced by various economic factors. These and other authors have not explicitly recognized that family size may be influence by the extent of household public goods.

VI. Love

To this point, the model of behavior in a marriage treats participants as selfish individuals interested only in increased consumption of own and the share of household goods. The model shows how self-interest can cause behavior desired by a family to diverge from that preferred by a mate. However, at least during the last century in the western world, couples are widely held to marry for reasons other than self-interest, the most important being marriage for love.

Economists have a simple technique to introduce love and caring into individual decision-making. Let the utility of M depend in part on the utility of F: $U_m = U_m$(own goods, household goods, U_f).[17] For now ignore the possibility that F also loves M. Converting the utility function to the value (inverse demand) functions used in this model, M value becomes the following:

$$(x) \quad V_m = sP + X + \Theta(V_f)$$

Θ is a function which converts value received by F to value received by M. Since value to F increases value to M, $\partial\Theta/\partial V_f > 0$. The value function for F remains the same as

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[17]Clearly M continues to maximize own happiness and so might still be considered to be motivated by self-interest.

before: $V_f = (1-s)P+Y$. Given the constraint on M's time, M's maximization equation becomes the following:

$$(y) \quad V_m = sP + X + \Theta(V_f) - \lambda(m_p+m_x-M)$$

Excluding the constraint equations, the first order conditions are the following:

$$(z) \quad \frac{\partial V_m}{\partial m_x} = \frac{\partial X}{\partial m_x} - \lambda = 0$$

$$(aa) \quad \frac{\partial V_m}{\partial m_p} = s\frac{\partial P}{\partial m_p} + \frac{\partial \Theta}{\partial V_f}(1-s)\frac{\partial P}{\partial m_p} - \lambda = 0$$

Rearrange these conditions yields the following:

$$(bb) \quad - \frac{\dfrac{\partial X}{\partial m_x}}{s\dfrac{\partial P}{\partial m_p} + \dfrac{\partial \Theta}{\partial V_f}(1-s)\dfrac{\partial P}{\partial m_p}} = -1$$

As before, M equates the marginal rate of substitution between time inputs to the slope of the time budget line. If M doesn't care about F, $\partial\Theta/\partial V_f=0$ and the ratio simplifies to that given previously in equation (s). Without love, M is inclined to misbehave by devoting less time to household production than is preferred by the family. By contrast, if M does care for F, the desire by M to misbehave can be reduced or even eliminated.

Consider the case where $\partial\Theta/\partial V_f=1$, that is, where M is indifferent between a dollar in value received by M or by F.

Becker [3] terms this situation "full caring".[18] The denominator of (bb) simplifies to $\partial P/\partial m_p$ and the resulting equilibrium is identical to that preferred by F in equation (j). If a mate considers own value to be the same as family value, the mate has no desire to misbehave.

"Full" caring is only one case, of course. If M cares less than fully about the family, $\partial\Theta/\partial V_f<1$. Here M's equilibrium response is between no caring and full caring since the slope of the equilibrium condition lies between those given by the extreme conditions (j) and (s). The selfish desire to misbehave is tempered somewhat by love for the family. If M considers own value of less importance than family value, $\partial\Theta/\partial V_f>1$. In this case, M is inclined to misbehave by devoting too <u>much</u> time to production of household goods. This latter case is likely less serious since policing problems are not as important.

VII. Family Love

Love makes a mate behave differently. Does love alter a family's preferences about a mate's behavior? Interestingly, the answer is no, with a single exception. Even without love, the family has always had to implicitly

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[18]Becker recognizes the importance of love and caring in reducing the cost of enforcing appropriate family member behavior but does not outline the specific effects on the temptation to misbehave.

consider value received by the mate. The family is constrained to assure that M receives income at least equal to the best alternative. Thus, F's value has always depended on M's value, and thus the addition of love has no effect on preferred allocation of time.

To show this, let the value function for F include a function $\Phi(V_m)$ which converts value to M to value to F.[11] Include this function in F's previous constrained maximization equation (b). The relevant first order conditions become the following:

$$\text{(cc)} \quad \frac{\partial V_f}{\partial s} = \frac{\partial s_p}{\partial z}\frac{\partial \Phi}{\partial V_m} - \frac{\partial s_p}{\partial z} + \frac{\partial s}{\partial z}\lambda_3 = 0$$

$$\text{(dd)} \quad \frac{\partial V_f}{\partial m_x} = \frac{\partial \Phi}{\partial V_m}\frac{\partial X}{\partial m_x} - \lambda_1 + \frac{\partial X}{\partial m_x}\lambda_3 = 0$$

$$\text{(ee)} \quad \frac{\partial V_f}{\partial m_p} = s\frac{\partial \Phi}{\partial V_m}\frac{\partial P}{\partial m_p} + (1-s)\frac{\partial P}{\partial m_p} - \lambda_1 + s\frac{\partial P}{\partial m_p}\lambda_3 = 0$$

Again, conditions (dd) and (ee) can be rearranged into an equilibrium condition with the following form:

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[11]The functions Φ and Θ may also be functions of the current distributions, of absolute incomes, or of other factors.

$$\text{(ff)} \qquad \frac{\dfrac{\partial X}{\partial m_x}\left[\dfrac{\partial \Phi}{\partial V_m} + \lambda_3\right]}{\dfrac{\partial P}{\partial m_p}\left[s\dfrac{\partial \Phi}{\partial V_m} + \lambda_3 - 1\right] + \dfrac{\partial P}{\partial m_p}} = -1$$

Assume the constraint on M's alternative income is binding and so $\lambda_3>0$. Notice from condition (cc), so long as s and P are positive, $\partial\Phi/\partial V_m+\lambda_3=1$. Now assume that F cares for M less than fully so that $\partial\Phi/\partial V_m<1$. Under these circumstances, condition (ff) simplifies to condition (j). Love has no affect on the allocation of M's time F prefers.

Upon reflection, this is a reasonable result. If F only "partly" loves M and M's income constraint is binding, the income constraint is more important than the love. One dollar of additional income to M means one less dollar to F and the value of the dollar lost to F is worth more to F than the dollar in value gained by M. Thus the income constraint rules F's behavior and desired allocation of time is unaffected by love.

With partial love and a non-binding constraint on M's income, the result is somewhat different. Equilibrium condition (ff) is solved with $\lambda_3=0$. The result is the following:

$$\text{(gg)} \qquad - \frac{\frac{\partial X}{\partial m_x} \frac{\partial \Phi}{\partial V_m}}{\frac{\partial P}{\partial m_p}} = -1$$

Without love and with a non-binding constraint on M's income, F exploits M but still requirs that M allocate time the same as with the binding constraint. When F partly loves M, the feelings toward M alter the desired allocation of M's time. In condition (gg) starting from the allocation of time given before, returning to equilibrium requires that the numerator of (gg) be bigger because $\partial X/\partial m_x$ is multiplied by the fraction $\partial \Phi/\partial V_m$ representing partial love. Thus equilibrium requires M to give more time to production of own goods and less to production of household goods.

Examination of first order condition (cc) shows that M is still given no share of household goods, however. Solving condition (cc) with λ_3=0 and rearranging terms yields the following:

$$\text{(hh)} \qquad \frac{\partial s}{\partial z} P[\frac{\partial \Phi}{\partial V_m} - 1] = 0$$

The term in parenthesis is negative because $\partial \Phi/\partial v_m < 1$. If $P \neq 0$, then $\partial s/\partial z = 0$. For a maximum, the second derivative of (cc) must be less than zero and so $s'' > 0$. This occurs when z=0 and s=0. Thus, even with partial love, F allows M no share of household goods. M must be consoled by being allowed more time for production of own goods than without love.

Interestingly, full love has no effect on the desired allocation of M's time. With full love, $\partial\Phi/\partial V_m=1$ and from condition (cc) $\lambda_3=0$.[20] The equilibrium condition again simplifies to (j).

With greater than full love $\partial\Phi/\partial V_m>1$. For equation (cc) to hold, $\lambda_3<0$. If this is so, the alternative income constraint is not binding and the first order conditions are solved by setting $\lambda_3=0$.[21] Doing so once again means that condition (cc) simplifies to condition (j).

Although full love has no effect on the choice of time inputs, it does affect the distribution of household goods. Looking at equation (hh), the term in parenthesis is now greater than one because $\partial\Phi/\partial V_m>1$. Once again, so long as $P\neq0$, $\partial s/\partial z=0$. For a maximum, the second derivative of (hh) must be less than zero, so $s''<0$. This is true when $z=1$ and $s=1$. With greater than full love allocation of time is not altered but F gives all household goods to M.

To summarize. Love reduces the desire of a mate to misbehave by giving less time to production of household goods than is preferred by the family. "Full caring," where value to the mate is equal to value received by the family,

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[20]F may still pay M the alternative income, but F does not feel constrained by this since dollars transferred to M have no affect on F's value.

[21]This means F is permitted to pay <u>more</u> than the alternative income and so the constraint is not binding.

eliminates misbehavior. Too much love also tempts a mate to misbehave, although this is arguably a less serious problem. In general, a family which loves a mate has the same preferences about mate behavior as does a family without love.

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