DISCUSSION PAPERS IN ECONOMICS

Building the Family Nest: A Collective Household Model with Competing Pre-marital Investments and Spousal Matching

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1. Introduction

Recent literature has shown that a treatment of the household as a single decision unit is not consistent with a growing body of empirical evidence on intra-household allocations.[1] Instead, the "collective" view, in which intra-household allocations are assumed to be efficient and individual members of the family are treated as the core decision-makers, has emerged as a compelling alternative.[2]

The collective household models suggest–and the empirical evidence supports–the notion that relative spousal incomes influence household allocations.[3] But while the collective approach to household behavior takes spousal incomes as given, these incomes

whether the intra-marital sharing rules that emerge endogenously in the markets for marriage yield unconditionally effi

the sharing rule or the bargaining power of the two sexes are determined exogenously and that couples have different preferences over the choice sets. In two exceptions, Basu (2001) and Iyigun and Walsh (2002) suggest models that treat the bargaining power of the sexes as determined endogenously according to actual relative earnings. Neither of these models, however, examine how the existence of pre-marital investments impacts intra-marital allocations in a collective household setting.

The second strand of the literature to which this work is related includes papers that explore how matching influences pre-marital investments in models where spousal incomes are treated as marital public goods. Earlier work in this line, such as Bergstrom, Blume, and Varian (1986), and MacLeod and Malcomson (1993), have shown that the equilibrium level of educational investments are below the Pareto efficient level when pre-marital investments are a public good in marriage. These papers do not take into account how endogenous matching might influence pre-marital investments. Peters and Siow (2002) argue that families make investments in education that are Pareto optimal once marital matching is endogenized. According to their results, in large marriage mar-

$_2[\ (\omega \quad 0)]$ and $_2[\ (0\ \omega\ )]$. (3)

where , 0, represents a common gain from marriage that is unrelated to spousal incomes and–given that incomes are dependent on investments–to pre-marital choices. Note that equation (6) holds as a strict equality for couples that match with each other

Parts 2 and 3 of the definition indicate that all individuals choose their spouses optimally in order to maximize their gains from marriage and as implied by equation (6). Accordingly, these two conditions yield the following two first-order conditions:[11]

$$^{2}(\omega^{*}) = \omega^{1}_{m}[\omega^{*}, \psi(\omega^{*})] \tag{9}$$

and,

subject to equation (11), and

$$\max$$

$^{*}(\quad)$ and $^{*}(\quad)$ and allocations in marriage, $^{2}[\omega^{*}(\quad)]$ and $^{2}[\omega^{*}(\quad)]$, define a rational expectations equilibrium if there exist endowments, and , for individuals in and

$$^{2} + ^{2} \qquad (\omega \quad \omega) + \tag{19}$$

and,

$$\omega \qquad \text{and} \quad \omega \tag{20}$$

In addition to the constraints of equations (18) and (19), the first-order conditions for this problem are

$$_{1}(\qquad \omega^{*}) = \; _{2}[\,^{2}] \;\; \omega_{m}^{!}[\omega^{*}, \omega^{*}] \tag{21}$$

and,

$$_{1}(\qquad \omega^{*}) = \; _{2}[\,^{2}] \;\; \omega_{f}^{!}[\omega^{*}, \omega^{*}] \tag{22}$$

These conditions can be re-written as in equation (23).

$$\frac{_{1}(\qquad \omega^{*}) \qquad _{2}[\,^{2}(\omega^{*})] \;\; \omega_{m}^{!}[\omega^{*}, \psi(\omega^{*})]}{_{2}[\,^{2}(\omega^{*})]\{\,^{2}(\omega^{*}) \qquad \omega_{m}^{!}[\omega^{*}, \psi(\omega^{*})]\}} = \frac{_{2}[\,^{2}(\omega^{*})]\{\,^{2}(\omega^{*}) \qquad \omega_{f}^{!}[\phi(\omega^{*}), \omega^{*}]\}}{}$$

To demonstrate the efficiency of the marriage market outcomes requires showing that these outcomes satisfy equations (19)-(22) and thus lie along the Pareto efficient frontier. This is easily done. First, note that the resource constraint of equation (19) is implicit in the construction of the marriage market outcomes. Second, not that the first order conditions for optimal investment in the marriage market model (equations(15) and (16)) are equivalent to equations (20) and (21). Therefore the marriage market outcomes are unconditionally efficient.

In Figure 3, we illustrate the equilibrium. In it, we super-impose the loci of the Pareto efficient frontier and the reservation utilities on the curve that shows the equilibrium combinations of pre-marital investments, the latter which was originally depicted in Figure 2.

[Figure 39ed

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numerically. We use this example to carry out comparative static analyses.

(I) Suppose that the distribution of endowments, , = , are uniform on [min max] with min 1. For simplicity, let the marital gain, , equal zero so that = = 0 and let the marital production function be given by

$$(\omega \quad \omega) = (\omega \quad \omega)^{1\ 2}. \tag{24}$$

Also suppose that the preferences of males and females are represented by the following inter-temporal utility function respectively:

$$= {}_1(\ ^1) + {}_2(\ ^2) = (\ ^1)^{1\ 2} + \ ^2 \tag{25}$$

and

$$= {}_1(\ ^1) + {}_2(\ ^2) = (\ ^1)^{1\ 2} + \ ^2 \tag{26}$$

$$\omega^0 \begin{cases} = \Omega^{\min} & \text{if } 1 \end{cases}$$

$$\omega^* = \frac{1}{1+} \quad \text{and} \quad \omega^* = \frac{1}{1+} \tag{34}$$

Therefore, the uniformity of the endowment distributions over [^{min},

model's general implications with respect to the optimal levels of pre-marital investment, intra-household sharing and the stability of marital sorting.

Suppose that the distribution of endowments,

and,

$$\omega^0 \begin{cases} = 0 & \text{if} \quad 1 \\ 0 & \text{if} \quad 1 \end{cases} \tag{45}$$

Using this example, we explore (a) the existence of a rational expectations marital equilibrium and (b) how changes in the sex ratios in the marriage markets, , influence this equilibrium.[13]

With respect to the existence of the marital equilibrium, we find in all the exercises we carry out that the marital matching functions $\phi(\omega\ )$ and $\psi(\omega\ )$ are such that, (ω^*, ω^*), $\omega^* = \phi(\omega^*)$ and $\omega^* = \psi(\omega^*)$. That is, in all specifications, our numerical exercise generates marital matching functions that are consistent with a unique rational expectations equilibrium in the marriage markets.

Figures 4 through 7 and Table 1 summarize the results of the numerical exercises. Figures 4 and 5 summarize the equilibria when = 1 25 and figures 6 and 7 for when = 1

household allocations and pre-marital investments, the relative importance of the sex ratio increases and that of relative spousal endowments decreases as the rank of a couple in the assortative order increases.

In Figures 6 and 7 and in section (c) of Table 1 we show the equilibrium choices for $= 1\ 53$. As can be observed, the general patterns we discussed above are retained in this case as well, although the disparities between the sexes in pre-marital investments, consumption levels, marital gains and intra-household allocation shares are magnified.

[Table 1 about here.]

[Figures 4 through 7 about here.]

8. Conclusion

In recent years the "collective" model of the household, in which individual members of the family are treated as the core decision-makers and a sharing rule generates efficient intra-household allocations, has emerged as the most promising framework for understanding household behavior. These models suggest that relative spousal incomes influence household allocations but they do not account for the fact that the household income can be determined at least in part by decisions individuals make prior to marriage. In models where spousal incomes are pure public goods, existing work has shown that such decisions can lead to inefficient pre-marital choices and intra-household allocations and further that the efficiency of pre-marital investments can be restored as a result of spousal competition in the markets for marriage. The collective household models rely on the efficiency of intra-household allocations but they do not address how pre-marital investments and marital matching can influence such allocations. However, given their rising prominence in analyzing household behavior, it is important to do so.

In this paper, we present the first attempt to extend to collective household model to cover pre-marital investments and matching in the marriage markets. Our endeavour shows that, for each couple, an endogenously determined sharing rule emerges as the

9. References

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Figure 1: The Marital Matching Function

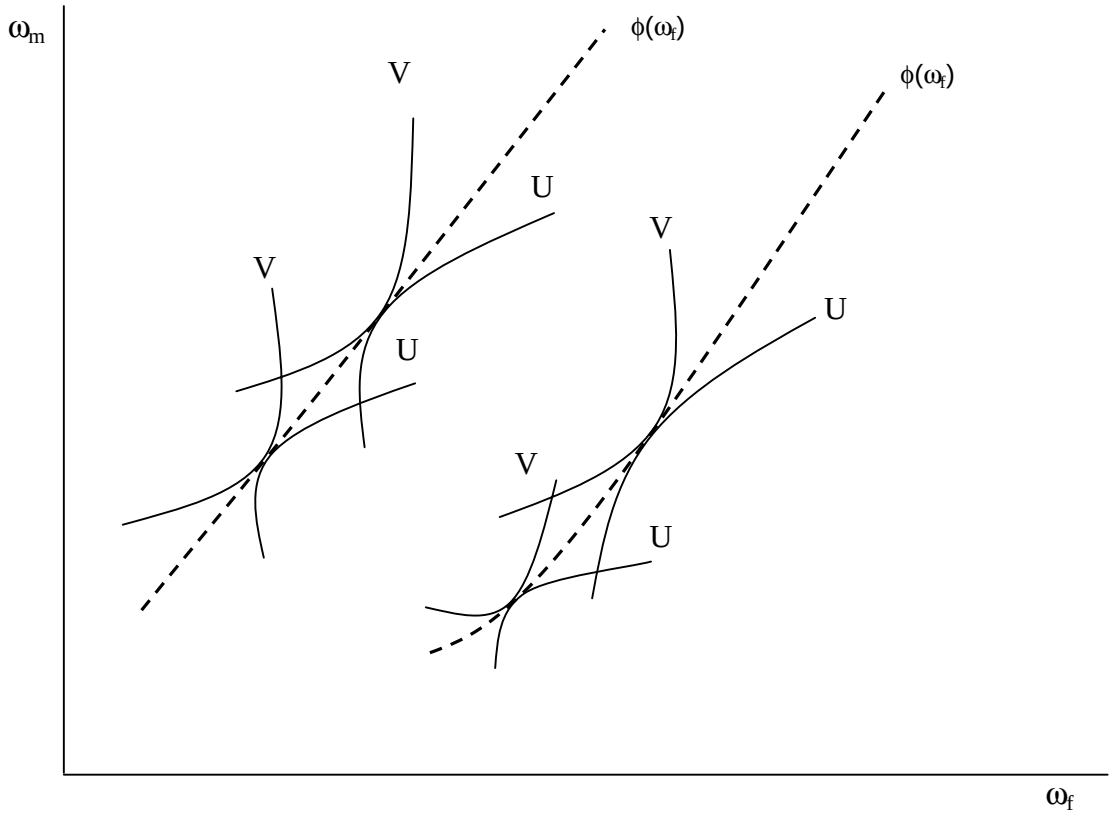


Figure 2: The Marital Contract Curve

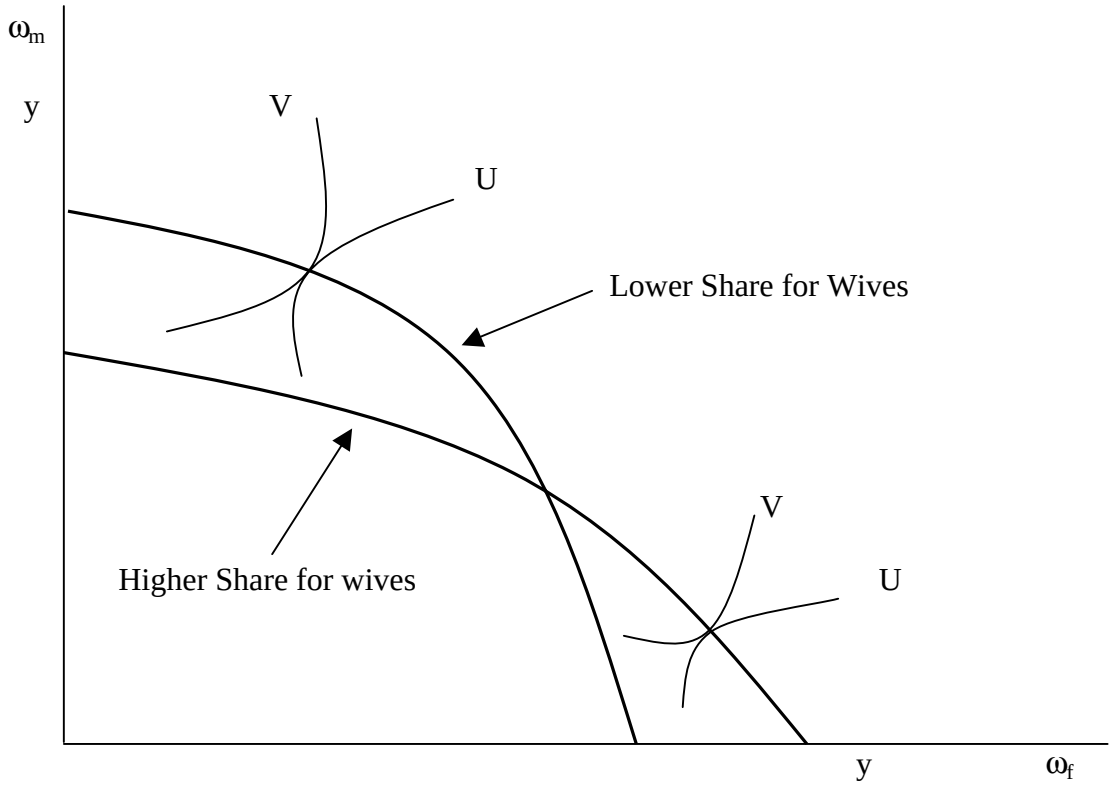


Figure 3: The Marital Contract Curve and the Efficient Frontier

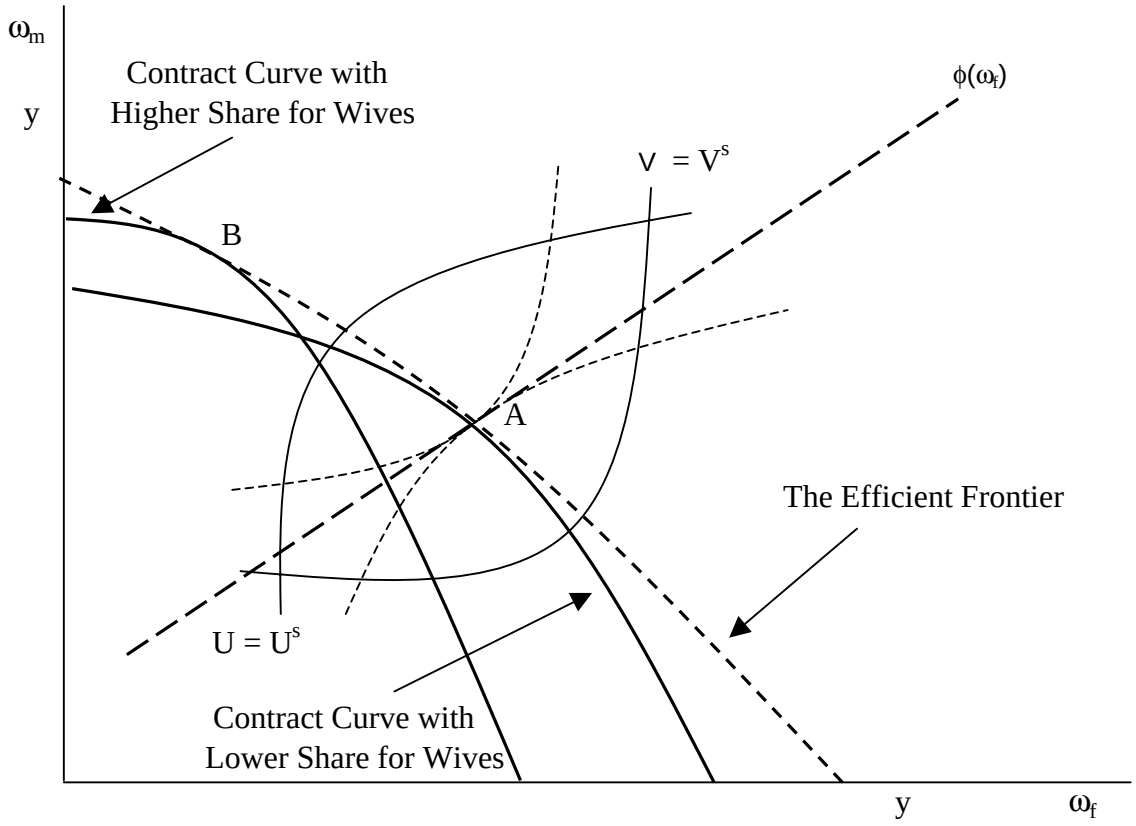
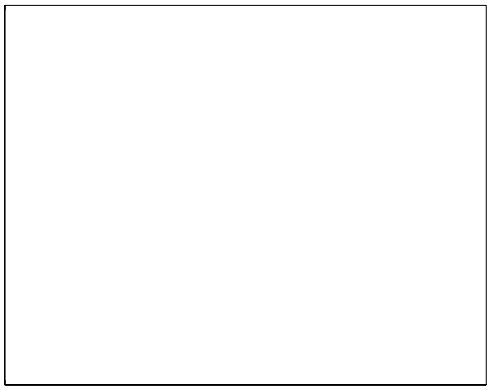
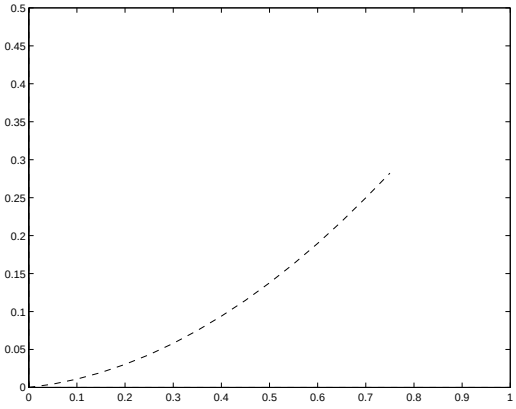


Figure 4: Consumption and Investment, R=1.25



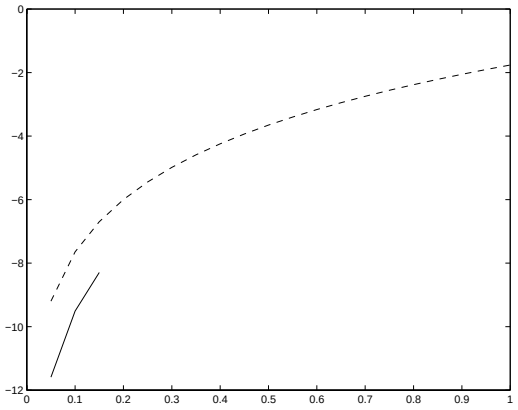
(a) First Period Consumption

(b) Investment

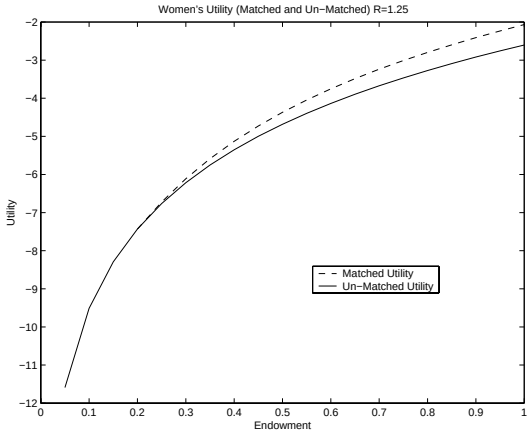


(c) Second Period Consumption

Figure 5: Utility and Surplus, R=1.25



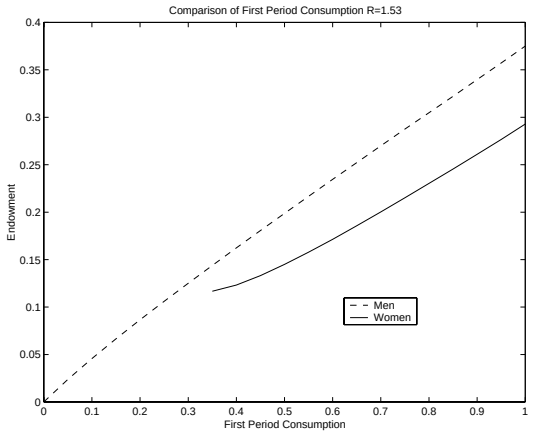
(a) Men's Utility



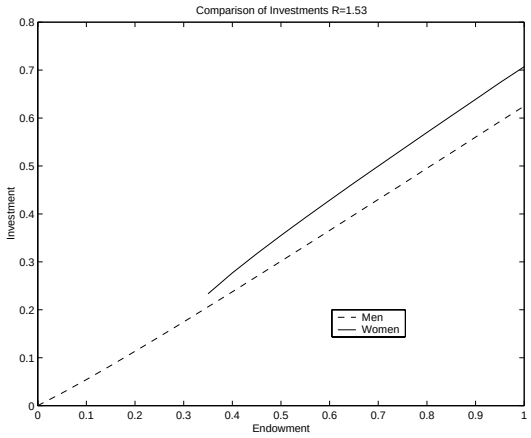
(b) Women's Utility

(c) Marital Surplus

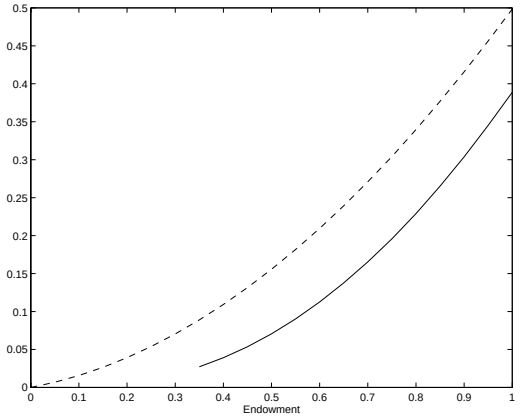
Figure 6: Consumption and Investment, R=1.53



(a) First Period Consumption



(b) Investment



(c) Second Period Consumption

Table 1: The Equilibrium with r = 1The