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Over-investment in marriage-specific capital

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HIGHLIGHTS

- A two-period model of household behavior is constructed.
- The decision process is described as a Rubinstein–Binmore bargaining game.
- Spouses make decisions about the consumption of a private good and a public good.
- The public good is durable and specific to the marriage.
- The decision process may lead to over-investment in the public good.

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ABSTRACT

We consider the decisions of a married couple in a risky environment. The distribution of spouses' bargaining power may change as a result of new outside opportunities that become available to them, so that individual consumption may fluctuate over time. This is what we call "bargaining risk". To reduce this risk, spouses may decide to over-invest in marriage-specific capital (which, by definition, is completely lost in the case of divorce) and thereby limit the attractiveness of spouses' outside opportunities. This strategy is shown to be optimal. More surprisingly, over-investment in marriage-specific capital remains an optimal strategy when spouses are confronted with a (small) risk of divorce. This is in contrast to the usual intuition.

1. Introduction

Some of the investments that married couples make are particular to their relationship, in the sense that they become much less valuable for spouses if the marriage dissolves (e.g., children or housing). These investments thus increase the gains to both individuals of continuing the relationship, and play an important role in explaining marriage duration (Becker, 1974, 1991; Ben-Porath, 1980; Pollak, 1985). Conversely, the possibility of dissolution discourages the accumulation of such marriage-specific goods (Landes, 1978; Johnson and Skinner, 1986; Peters, 1986; Lommerud, 1989; Lundberg and Rose, 1999; Stevenson, 2007).[1]

Our claim in the present paper is that, in an uncertain context with risk-averse spouses, household decisions may lead to over-investment in marriage-specific capital (defined as investment over the optimal level observed when the consumption profile is determined by a binding contract at the beginning of the planning horizon) despite the possibility of divorce. We obtain this counter-intuitive result from a two-period model of household behavior, in which spouses make decisions about the consumption of both a private and a public good. The public good is durable (over two periods) and is specific to the relationship, in that its value falls in the case of divorce. We then suppose that, in general, couples cannot credibly commit to a fair division of future consumption, since any current agreement can be renegotiated.[2] The future financial situation of spouses, which will influence the intra-household balance of power, cannot be predicted at the time of marriage. If the state of nature turns out to be markedly

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[1] The possibility of underinvestment in the context of the firm is well documented in the holdup literature. This intuition dates back to Williamson (1975) and Klein et al. (1978), and was formalized by Grout (1984); surveys of these models can be found in Hart and Holmstrom (1987) and Malcomson (1997). Crawford (1988, 1990) and Tirole (1986) show that over-investment may sometimes arise from the multiplicity of equilibria. Rotemberg and Saloner (1987) and Muthoo (1998) present some particular situations where over-investment is the rule. The problem of the couple differs from that in the traditional holdup literature as (i) the decision to invest in marriage-specific capital is made jointly by both spouses, and (ii) divorce results from exogenous shocks that affect marriage surplus. Underinvestment is, however, supposed to be the general case, as underlined by the papers cited above.

[2] The consequences of the non-existence of enforceable intertemporal contracts for couples are examined in many models (Konrad and Lommerud, 2000; Lundberg, 2002; Rainer, 2007; Wells and Maher, 1998). In these models, under-investment in marriage-specific capital is the rule.

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favorable to the husband (say), the latter may be inclined to take advantage of the situation and renege on the agreement made with his wife. The decision process is then described as a simplified Rubinstein–Binmore bargaining game, the outcome of which is second-best efficient. These fluctuations in consumption which result from changes in spouses' bargaining power are what we hereafter call "bargaining risk". This form of risk may persist even if, in the end, divorce never occurs.

We consider two versions of the model. In the first, there is no possibility of divorce. The spouses' relationship continues because the surplus from marriage generated by the marriage-specific good is positive and constant over the two periods. Even in this case, however, bargaining risk reduces the intertemporal utility of individuals living in multi-person households (as long as they are averse to risk, of course). An informal system of insurance then consists of investing more in marriage-specific capital, which reduces the attraction of spouses' outside opportunities, and therefore any fluctuations in bargaining power. We prove that this strategy is optimal.[3] The corollary is that the variance in individual consumption is lower in high-income than in low-income households. In the second version of the model, we introduce the possibility of divorce. Over the course of the marriage, new information is received by spouses which changes their subjective evaluation of the surplus from marriage. A large, negative shock to the marriage surplus may, ultimately, lead the couple to break up (which entails the complete loss of any investment in marriage-specific capital). We then show, perhaps surprisingly, that over-investment in marriage-specific capital may even be greater in this version of the model – at least when the risk of divorce remains moderate – than in the version with no divorce. The explanation is that investment in marriage-specific capital is more profitable in terms of reducing bargaining risk when spouses face small, negative shocks which do not necessarily lead to divorce.[4]

The remainder of the paper is structured as follows. The main assumptions regarding preferences, the form of uncertainty and the decision process are presented in Section 2. Over-investment in marriage-specific capital in a non-divorce model is then discussed in Section 3, and the results are generalized to the divorce context in Section 4. Last, Section 5 concludes.

2. The model of the household

2.1. Goods, preferences and uncertainty

In this section, we will set out the main assumptions of the model. We first describe the utility functions and then introduce uncertainty.

To fix ideas and simplify notation, we consider a two-person household in a two-period setting. During the first period, the spouses make decisions about the optimal levels of consumption of a private good and a public good. During the second period, the spouses spend their resources on the sole private good. The public good has two features: (i) it can be consumed over two periods, i.e., the good is durable, and (ii) its consumption is specific to the marriage, i.e., the good is totally lost in the case of divorce.[5] This good can typically be interpreted as a non-divisible marketable capital good (such as the spouses' house, at least if transaction costs are large) or a non-divisible non-marketable capital good (such as children or love). Let x_{it} denote the individual consumption of the private good of spouse i ($i = 1, 2$) in period t ($t = 1, 2$), and X the consumption of the public good (i.e. the marriage-specific capital).

Spouses have identical, intertemporally-additive utility functions, and the discount factor in the second period equals one (i.e. there is no time impatience). Our argument would be more complicated but not significantly altered were spouses' preferences to be different.[6] We thus suppose the following.

Assumption A1. The utility functions in each period are of the Von-Neumann–Morgenstern form with an additive structure, that is,

$$U = u(x_{it}) + v(X), \tag{1}$$

where $v(\cdot)$ is a twice-differentiable function which satisfies

$$v'(X) > 0, \qquad v''(X) \leq 0, \quad \text{and} \quad v(0) = 0,$$

and $u(\cdot)$ is a three times differentiable function which satisfies

$$u'(x_{it}) > 0, \qquad u''(x_{it}) < 0, \qquad u'''(x_{it}) \geq 0,$$
$$u'(0) = \infty, \quad \text{and} \quad u'(\infty) = 0.$$

Following the sign of these derivatives, the spouses can be said to be risk-averse and prudent.[7] In the remainder of this paper, we shall consider additional restrictions on these utility functions.

The household as a whole receives an exogenous income, denoted by Y_t, in each period t. These incomes are non-stochastic and are completely determined at the beginning of the first period. If the price of all goods is set to one, the budget constraint in the first period is thus $x_{11} + x_{21} + X = Y_1$, and that in the second period is $x_{12} + x_{22} = Y_2$. Household income in the second period can be broken down into individual incomes: $Y_2 = y_1 + y_2$, where y_i is the exogenous personal income of spouse i. The distribution of individual incomes between spouses is stochastic and is such that

$$y_1 = \frac{Y_2}{2} - \Sigma\varepsilon, \qquad y_2 = \frac{Y_2}{2} + \Sigma\varepsilon \tag{2}$$

where ε is a random term with a symmetric distribution over the support $\left[-\frac{1}{2}, +\frac{1}{2}\right]$ and $0 < \Sigma \leq Y_2$ is a dispersion parameter. At the end of the first period, each spouse is informed of their individual income y_i in the second period. The distribution of these individual incomes is thus the only source of uncertainty for the moment (since the sum of individual incomes is deterministic). This form of risk is purely idiosyncratic and can be eliminated by an efficient insurance mechanism between spouses. The fact that there are no legally-enforceable marital contracts is exactly at the heart of this paper.

2.2. The sharing of private consumption

In this subsection, we consider how spouses divide up private consumption between themselves *conditional on the level of marriage-specific capital*.

Private consumption is shared between spouses according to some rule that depends on the household environment. Since the environment that we consider is initially symmetric (the same

[3] More surprisingly, it may also be optimal if the public good is supplied by voluntary contributions instead of being efficiently determined.

[4] It is obvious that the results that follow can be applied to any form of partnership, for instance, a small group of highly-specialized workers or a duopoly, as long as (i) investments in relationship-specific capital are involved and (ii) opportunistic behavior cannot be prevented.

[5] The public good can alternatively be seen as being produced with a linear technology using money as an input. Lommerud (1989) and Lundberg (2002), for example, suppose that the public good is produced via a technology using spouses' time inputs. The spouses' time devoted to domestic chores in the first period enhances productivity in the second period. In this case, the increase in household productivity is largely specific to the relationship because the public good is less valuable in the case of divorce.

[6] Browning (1996, 2000) suggests that the discount rate of the future may be larger for husbands than for wives.

[7] Even though the utility functions have two arguments, this interpretation is well-founded: as will be shown below, only individual consumption in the second period is stochastic.