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Elective Affinities

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Abstract

We propose a marriage model where assortative matching results in equilibrium for reasons other than those driving similar results in the search and matching literature. A marriage is a joint venture where husband and wife contribute to the couple's welfare by allocating their time to portfolios of risky activities. Men and women are characterised by different preferences over risk and the optimal match is between partners with the same level of risk aversion. In our model no two men (women) rank the same woman (men) as most desirable. Given that there is no unanimous ranking of candidates, everyone marries in equilibrium their most preferred partner.

Keywords: Marriage Model, Risk Aversion

1. Introduction

The view of marriage we have in economics since Becker's contribution [1] is rather grim.[1] Becker explained the common observation that like marries with like on the basis of a matching model where assortative pairing results as an equilibrium outcome. The model builds on a heterogeneous population of males and females whose distinctive characteristic, say beauty, can be ranked in terms of desirability to the partner in an objective way.[2] A common ordering of types guarantees that all the boys agree that females are ranked in desirability from the most plain of women all the way to, say, Angelina Jolie. Similarly all girls agree that males can be ordered from the world's worst looking man to, obviously, Brad Pitt. Pairing occurs through search. Boys and girls look for their best match. All boys would love to marry Angelina Jolie and all girls would love to marry Brad Pitt. However matches have to be agreed by both parties involved and Angelina Jolie certainly would not settle for anything less than Brad Pitt. Now, if Brad takes Angelina (as it happens), the best match for the second boy down the line is the girl that falls one rank short to Angelina. And so forth. The result is that we are all matched with the best partner we are able to reach, and this is someone who is equally ranked to us in beauty. Like marries with like, as in the common wisdom.

Now, for those of us who are not Angelina Jolie this provides a rather grim view of marriage. When we express our vows we like to think that we are marrying the only one we would ever consider to marry, the best man in the world. By contrast, Becker's view is that we are actually marrying the only one we could get!

In this note we propose a happier view of marriage, where matching results out of elective affinities. We think of marriage as a joint venture: in their married life, husband and wife commit to share any outcome resulting from the risky choices they make. Hence what may or may not make a potential partner desirable is his or her attitude towards risk. In a population of males and females who are heterogeneous in risk preferences, we derive assortative matching as an equilibrium outcome where like marries with like. Unlike in Becker's story, here all men and women manage to marry the best partner they could ever dream for themselves because there is an Angelina Jolie and a Brad Pitt for everyone.

Although these two alternative views of marriage end up with the same matching outcome, we believe that we are proposing a much happier view of marriage, with no regrets.

[1]For more recent reviews, see Becker [2], Bergstrom [3], Weiss [4], Browning Chiappori and Weiss [5].
[2]Of course beauty is only one of the possible desirable characteristics of a man or a woman. We take beauty here just for the sake of an example.

2. The Model

Men and Women are endowed with one unit of time which they must allocate to a portfolio of risky activities. To make the analysis simple, we assume that there are only two types of activities: a risky activity which returns a payoff $r > 1$ with probability p and zero with probability $(1 - p)$; and a safe activity which returns 1 for each unit of time invested.[3] The risky activity has a (strictly) higher expected return than the safe. Payoffs generated by life activities are here expressed in terms of income, but could easily be interpreted as lifestyle quality, children education, health, or any other variable that matters for the welfare of the couple. Preferences over risk are of the expected utility form, with Bernoulli utility functions over income (w) $u(w,\theta)$ where θ is a risk aversion parameter. We assume that utility is monotonically increasing and strictly concave in income. We normalise the Bernoulli utility function so that $u(w,\theta)=0, \forall\theta$. Formally:

Assumption 1. The risky activity has a higher expected return than the safe: $pr > 1$.

Assumption 2. Individual utilities over income $u(w,\theta)$ are such that.

$$\frac{\partial u(w,\theta)}{\partial w} > 0, \frac{\partial^2 u(w,\theta)}{(\partial w)^2} < 0$$

and $$u(0,\theta) = 0.$$

Men and women are heterogeneous in their risk aversion parameter. In particular, both women's and men's risk aversion parameter ranges between a lower bound $\underline{\theta}$ and an upper bound $\overline{\theta}$, and it is uniformly distributed. The double continuum assumption guarantees that, for each risk aversion parameter θ, there are one man and one woman (and no more than one) with preferences represented by $u(w,\theta)$.

Marriage is a joint venture. Man and wife both decide simultaneously and independently on their preferred time allocation over the two available activities. Any winnings are equally shared by the couple.[4] We assume that the realisations of the risky activity in which man and wife invest are independent random draws. Under this assumption, expected utility of man i when wife *j*'s time share in the risky activity is x_j is equal to:

$$p^2 u\left(\frac{x_i r + (1-x_i) + x_j r + (1-x_j)}{2}, \theta_i\right)$$
$$+ p(1-p) u\left(\frac{x_i r + (1-x_i) + (1-x_j)}{2}, \theta_i\right)$$
$$+ p(1-p) u\left(\frac{(1-x_i) + x_j r + (1-x_j)}{2}, \theta_i\right)$$
$$+ (1-p)^2 u\left(\frac{(1-x_i) + (1-x_j)}{2}, \theta_i\right)$$

The marriage game is in two stages: a proposal stage and a married life. In the first stage, couples are formed. In married life, partners independently decide how to allocate their time across the two activities. Uncertainty is revealed and payoffs are distributed at the end of married life.

We show that the marriage game admits a unique Subgame Perfect Nash Equilibrium (SPNE) where in the proposal stage agents match with partners of equal preferences over risky outcomes. In married life, man and wife go on to invest more in the risky activity than they would if they were investing on their own, due to mutual insurance.[5]

Proposition *Optimal partner choice is such that* $\theta_i = \theta_j$.

Proof. We solve for Subgame Perfect Nash Equilibria (SPNE). Hence we proceed by backward induction. In the second stage agent *i* chooses his optimal investment in the risky activity $x(\theta_i, x(\theta_j))$, given his own risk aversion parameter θ_i and given the choice of his wife $x(\theta_j)$. For notational convenience denote by x_{i} and x_j man *i*'s and wife *j*'s choices respectively. For any given choice of wife *j*, x_j, the optimal investment in the risky activity by i solves:

$$p^2 \frac{\partial u}{\partial w}\left(\frac{x_i r + (1-x_i) + x_j r + (1-x_j)}{2}, \theta_i\right)\frac{r-1}{2}$$
$$+ p(1-p)\frac{\partial u}{\partial w}\left(\frac{x_i r + (1-x_i) + (1-x_j)}{2}, \theta_i\right)\frac{r-1}{2}$$
$$= p(1-p)\frac{\partial u}{\partial w}\left(\frac{(1-x_i) + x_j r + (1-x_j)}{2}, \theta_i\right)\frac{1}{2}$$
$$+ (1-p)^2 \frac{\partial u}{\partial w}\left(\frac{(1-x_{\mathrm{i}}) + (1-x_j)}{2}, \theta_{\mathrm{i}}\right)\frac{1}{2}$$

Similarly, wife *j* takes man *i*'s allocation choice as given and solves:

[3]Lotteries are here assumed to be binary only for mathematical convenience. We believe that our qualitative results would go through even if we modelled uncertainty through non-binary variables.

[4]As long as we assume homotetic preferences, the results of our model carry through when one considers an exogenous sharing rule (α,1-α).

[5]We do not report second stage results here, but the increased riskiness in the individual portfolios of activities chosen by the couple follows from mutual insurance (see Di Cagno, Sciubba and Spallone [6]).

$$p^2\frac{\partial u}{\partial w}\left(\frac{x_i r+(1-x_i)+x_j r+(1-x_j)}{2},\theta_j\right)\frac{r-1}{2}$$
$$+p(1-p)\frac{\partial u}{\partial w}\left(\frac{x_i r+(1-x_i)+(1-x_j)}{2},\theta_j\right)\frac{r-1}{2}$$
$$=p(1-p)\frac{\partial u}{\partial w}\left(\frac{(1-x_i)+x_j r+(1-x_j)}{2},\theta_j\right)\frac{1}{2}$$
$$+(1-p)^2\frac{\partial u}{\partial w}\left(\frac{(1-x_i)+(1-x_j)}{2},\theta_j\right)\frac{1}{2}$$

Notice now that, for $\theta_i=\theta_j$, the first order conditions of agents *i* and *j* coincide and correspond to a global optimum for player *i* (and *j*). In fact, wife *j* with the same preferences as man *i* chooses for herself the same portfolio of activities that man *i* would have chosen for his wife, had he been free to optimise both with respect to his own portfolio and with respect to his wife's. Given that second period expected payoffs correspond to a global maximum for agent *i* whenever $\theta_i=\theta_j$, first stage choice falls on a partner with equal risk aversion parameter.

3. Conclusions

We propose a marriage model where assortative matching results from elective affinities. The risky choices that partners make in life affect the couple's welfare. Hence a good match is a match between man and wife with similar risk preferences. There is no given level of risk aversion that is desirable per se and if we could order potential partners by their desirability, our orderings would not coincide, so that there is no need for us to fight for the same man or the same woman. Every man has his Angelina Jolie. Every woman has her Brad Pitt. Surely a happy world.

4. Acknowledgements

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5. References

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