

Book Review

Matching with Transfers: The Economics of Love and Marriage" by Pierre-André Chiappori

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This book uses matching theory with transferable utility to analyse the economics of family and marriage patterns. It provides a useful survey of the authors' impressive contribution to this literature. It is recommended reading for those interested in general matching theory and especially for the more specialised readers interested in the analysis of topics in family economics and marriage formation. The book also provides a blueprint on how these models can be extended to study other topics.

There are three important general contributions:

The first important message is that decisions on marriage and family issues are interrelated with many other aspects of economic behaviour, such as work and education. Crucially, that this link can be bidirectional. The book presents in detail models which provide a matching framework appropriately extended to analyse how seemingly unrelated events may affect behaviour within marriage of all agents, not only those directly involved. Examples of this are divorce law and birth control legislation. Furthermore, the book shows the benefits of embedding matching models in a more general equilibrium framework. An example of this is the pre-marital education decision - as education is likely to affect marriage options, and the particulars of this depend on the characteristics of the resulting marriage market, decisions related to education and marriage are interlinked.

The second important insight is the acceptance and explicit use of asymmetry between men and women in studying family issues. This asymmetry can show both in different preferences regarding family related events and decisions and in the different effects of these across genders. For example, attitudes towards childbearing can differ between men and women, while the effects of childbearing on a woman's working life are much more pronounced than for men. Not shying away from this asymmetry is key to obtaining theoretical results that can explain observed patterns in marriage and within family behaviour.

The third message is that formal analysis of these issues is required in order to design rigorous empirical strategies to replace more ad-hoc empirical exercises.

Chapter 1 provides an intuitive motivation by addressing two established empirical issues which, it can be argued, have not received the required attention from a theoretical perspective. These are the questions of inequality and demand for higher education. It also provides an introduction to characteristics of matching models which are particularly relevant in the context of family economics: the degree to which partners' decisions have a direct effect on each other (unitary and collective models) and the degree to which this first effect can be compensated by transfers between partners (transferable, non-transferable and imperfectly transferable utility -- TU, NTU and ITU). These two issues collectively help to determine the balance of power within the couple, and thus the extent to which related phenomena influence this balance of power.

Chapter 2 provides a useful basic characterisation of TU, NTU and ITU models, and sets up the formal analysis of TU models that follows. Chapter 3 addresses in detail the baseline model: a matching model with transferable utility and heterogeneous men and women characterised by a vector of traits, with a supermodular surplus. The main results are as follows: First, any stable matching configuration maximises aggregate surplus. Second, the pattern of who marries whom depends on how partner's

characteristics enter the surplus generated by the match, with supermodularity yielding assortative matching. Third, who remains single is determined by the first derivative of particular gender characteristics on the match surplus. Fourth, the least attractive matched agent in the long side of the market (the marginal agent) is indifferent between getting married or remaining single, therefore improving her situation positively affects all agents ranked above him/her. Thinking of income as the trait that characterises each gender, even this simple model is empirically useful. An increase in female income brings about a change in the balance of power within couples in favour of women, which in turn results in a redistribution of utility within couples accordingly.

This baseline model results in additional clean but somewhat unrealistic predictions. First, the most attractive man marries the most attractive woman, the second most attractive marry each other, until the population on the short side of the market is exhausted. Second, it follows that all individuals on the short side of the market end up married. Chapter 4 allows for a richer set of results by introducing heterogeneity in the form of random shocks that affect the surplus generated by a marriage. Unfortunately, this generally results in untractable models unless the random term is additively separable into a woman-specific shock which depends only on men's characteristics and a man-specific shock which depends only on the women's characteristics. The chapter concludes with a detailed discussion of the empirical implementation.

Chapter 5 introduces additional extensions, I address the two most interesting ones. Firstly, the question of the pre-investment in education, a choice which effectively endogenises the traits on which agents match. This is investigated using a rational expectations model in which individual educational choices depend on the expected returns to education, while the results of the matching game (and thus these expected returns) depend on the aggregate educational choices. An important result follows: with transfers, educational choices tend to be efficient, a result that is counterintuitive at first but stems from the competitive nature of matching models due to the lack of frictions (this is intimately related the results in Chapter 3 and is particularly useful in Chapter 6). Secondly, the case of multidimensional matching where agents match on more than one trait. When the impact of a vector of agent characteristics on match surplus can be summarised by a one-dimensional index, the matching game is in fact uni-dimensional. Two important results are: 1) There exists a marginal rate of substitution across any two traits in the index, and 2) Two agents who are perfect substitutes for one agent on the other side of the market, are also perfect substitutes for everyone else. The chapter concludes by addressing how these two results are exploited for empirical implementation of the theory.

Chapter 6 presents two richer models that analyse the interesting topics of abortion legislation and the recent puzzle that women's demand for higher education has increased faster than that of men's. Due to the richness of the results, I will address them only partially. With respect to the first question, the main assumptions of the model are: 1) Within marriage, childbearing increases the utility of both men and women, 2) Single women derive utility from out of wedlock children but men do not, 3) Women's income decreases with childbearing, and this is not so for men, and 4) There is a positive probability of an unwanted pregnancy (notice the gender asymmetry introduced by 2) and 3)). When there are more women than men, parameters can be such that the stable matching has the marginal woman preferring to remain childless while single: In that case, the relaxation of abortion laws improves her situation, and this effect is transmitted to all (married) women that rank above her. This is not the case when the marginal woman is not interested in an abortion. Overall, the relaxation of abortion laws could affect married women who do decide to have a child.

Regarding the education puzzle, the baseline model is augmented by adding a first stage in which both men and women make a binary education decision that is subject to idiosyncratic costs, the

distribution of which differs across genders (once again, a key asymmetry in the model). The second stage is a matching game that is conditioned on the resulting proportions of educated men and women. The main insight is that education yields two types of returns in this setting: the standard labour market returns and also the "marriage market" returns. The latter include the effects on the probability of getting married, the characteristics of the partner, the size of the surplus and balance of power within couples. Because of the competitive nature of the matching framework, both the educated and uneducated men and women have perfect substitutes and this eliminates rents. Coupled with the fact that stable matchings maximise aggregate surplus, and given the specified returns as singles, this allows to pin down the returns to schooling for both men and women. The outcome depends on the nature of the asymmetry -- when male education costs are relatively low, when the effect on marital surplus of male education is high, and when the effect of female education is low, then the equilibrium proportion of educated males is higher than the proportion of educated females. This scenario is supported by any small asymmetry that leads to males specialising in the labour market and females specialising in household activities. Then, a decrease in female education costs and/or an increase in marital surplus resulting from female education (for example due to benefits in child upbringing) lead towards the opposite outcome, in which the equilibrium proportion of educated females is now higher than that of males. The chapter concludes by addressing the empirical implementation of this and related results.

Chapter 7 reminds us that in some cases matching models with transferable utility are not suitable since couples behave as a single decision maker, so the demand of public goods is the same for all Pareto-efficient allocations. This is important when studying, for example, household expenditures on children, for which an ITU model is required.

The author delimits the scope of the book very clearly in the introduction. Nevertheless, it would benefit from an extended discussion of the implications of the search framework. For example, the well-known Burdett and Coles (1997) shows that frictions in the marriage market easily surmount the unrealistic perfect assortative matching in Chapter 3. Similarly, a newer contribution, Bonilla, Kiraly and Wildman (2017), incorporates the substitutability of different traits in a framework with frictional marriage and labour markets, which is intimately related to the results on multidimensional matching in Chapter 5.

References

1. Burdett, Kenneth, and Melvyn Coles, "Marriage and Class", *Quarterly Journal of Economics* 112 (1997), 141-168.
2. Bonilla, Roberto, and Francis Kiraly, and John Wildman, "Beauty Premium and Marriage Premium in Search Equilibrium: Theory and Empirical Test", CESifo Working Paper No. 5242, 2017