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What mom and dad's match means for junior: Marital sorting and child outcomes

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HIGHLIGHTS

- Estimates of an empirical marital matching model show high levels of assortative matching and marital surplus for similarity in partner characteristics like education, age and religion.
- Marital surplus is significantly associated with indices of child quality, as measured by cognitive test scores.
- Marital surplus remains statistically significant after controlling for individual parental characteristics, suggesting that the marital match itself plays an important role in child outcomes.

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ABSTRACT

This paper employs recently developed marital matching models to examine empirically the role played by marital sorting in observed measures of marital production. Using the US Collaborative Perinatal Project (CPP), a large-scale study from the 1960s, and the National Longitudinal Survey of Youth 1979 (NLSY), we find that marital surplus is strongly correlated with indices of child quality, as measured by cognitive test scores, and with the durability of the marital union. At ages beyond infancy, the correlation between cognitive outcomes and marital surplus is robust to the inclusion of the parental characteristics that generate the match, suggesting that the correlation represents effects of the match itself. High marital surplus is associated with assortative mating on education and age, suggesting complementarity in parental inputs in child production. Our results suggest that marital surplus is an important input for child quality above and beyond its indirect effects on marital stability.

1. Introduction

This paper examines the role that spousal sorting in the marriage market may play in marital production, specifically child cognitive outcomes and the likelihood of divorce. While there have been large literatures on marriage markets and the intergenerational transmission of parental characteristics and there has been renewed interest in the conditions of early-life development in general (Cunha et al., 2006; Almond and Currie, 2011), no previous research of which we are aware has focused on how joint parental characteristics generated by the marriage market may affect child outcomes.

Our contribution is primarily empirical, and it represents a first step toward merging disparate literatures. We are interested in the effects of parental matching on child outcomes. To examine this issue, we first estimate matching models across a range of characteristics to recover spousal preferences on partner characteristics in the marriage market, including age, education, religion, and physical characteristics. We use two data sources: the U.S. Collaborative Project (CPP), a large-scale longitudinal survey collected around 1960 that covers roughly 30,000 children with data on both parents and developmental measures for children (Niswander and Gordon, 1972; Edwards and Roff, 2010), and the National Longitudinal Survey of Youth (NLSY79) merged with NLSY79 Children data, which allows us to update the analysis with slightly less rich, but more current data. Using observed matching patterns in these data sets, we estimate marital surplus empirically to investigate how marital surplus may be associated with child outcomes as measured by a battery of cognitive tests, as well as the probability of divorce. Marital surplus, or the gains to marriage for both partners, may include gains from joint production and consumption, including gains from economies of scale and efficiency in home production as well as the enjoyment of children and time spent together as a family.

Recent literature has focused on marital sorting over multiple characteristics to examine how partners may effectively 'trade off' one characteristic for another. There is renewed interest in matching models, led first by Choo and Siow's (2006) estimation of a transferable utility model to rationalize marital decisions with a systematic and idiosyncratic component. Theoretical contributions to this framework

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have further explored the identification of matching games and have estimated matching models on socioeconomic and demographic characteristics like education and race (Iyigun and Walsh, 2007; Fox, 2010; Chiappori et al., 2011; Galichon and Salanié, 2010; Galichon and Salanié, 2011; Echenique et al., 2013). Literature has demonstrated that personality traits and physical characteristics play an important role in the match as well. Dupuy and Galichon (2012) show that personality traits make up about 20% of marital surplus, while Chiappori et al. (2012) estimate marginal rates of substitution on partner socioeconomic and physical characteristics and find evidence that men may compensate for a higher own body mass index via providing a higher wage, and that these effects are much smaller for women. Recent research has relaxed some assumptions, such as efficiency, about marital bargaining. Friedberg and Stern (2014) estimate a model that allows for asymmetric information between spouses and allows spouses to generate utility from partners' utility and find evidence of both asymmetric information and caring preferences.

A variety of research has identified intergenerational effects of education and parental age on child outcomes (Behrman and Rosenzweig, 2002; Currie and Moretti, 2003; Plug, 2004; Antonovics and Goldberger, 2005; Black et al., 2005; Carneiro et al., 2012). Others have estimated child productions as a function of parental inputs, such as time (Todd and Wolpin, 2003; Bernal, 2008; Cunha et al., 2010). Del Boca et al. (2014) estimate a child production function using a variety of parental inputs and find that time inputs of both parents are important for child development.[1] However, there has been little work focusing on possible tradeoffs and interactions between parental characteristics or on how these tradeoffs may affect marital public goods, such as children (see Beck and Gonzalez-Sancho, 2009 for an exception). Neither has there been research using recent advances in marital matching models to investigate these issues empirically.

Our findings here indicate that marital surplus derived from matching models is strongly correlated with key measures of marital production, in particular child cognitive scores and the probability of divorce. Moreover, these effects are robust to the use of multiple matching specifications that employ different characteristics to calculate marital surplus. Perhaps most interestingly, marital surplus continues to have a significant effect even after separately controlling for flexible forms of parental characteristics in our linear regression models. This suggests that the match per se is affecting measures of marital production, rather than only individual parental characteristics. Given that one of the motivations to marry in the first place is to augment productivity of marital and other goods, this result is not altogether unexpected. However, we also view it as a novel result worthy of further inquiry.

2. Matching theory applied to marriage markets

Becker (1973) provides a seminal contribution upon which much subsequent research has built. One of his core insights is that patterns of assortative mating are likely to be driven by the degree of complementarity between parental characteristics in child production, a key goal of mating. Empirical patterns of similarity between spouses along dimensions like education, height, parental wealth, and race suggest that many parental characteristics are more complements than substitutes (for example, Dalmia and Lawrence, 2001; Nakosteen et al., 2004; Siow, 2009; Charles et al., 2013). Although Becker foresaw that the degree of complementarity was theoretically ambiguous, not all aspects of the data fit Becker's basic model cleanly, in particular the relationship between male and female potential earnings observed in a couple.[2]

Recently, Galichon and Salanié (2010) have developed a framework that uses covariation in the data from the observed match to estimate preferences on partner characteristics as well as to estimate overall marital surplus. As the title of Galichon and Salanié's paper suggests, this approach is particularly useful for examining observed matching patterns to illuminate preferences and tradeoffs among multi-dimensional characteristics that marriage market participants make when finding a mate. We use this framework to estimate preferences on joint characteristics in the marriage market. In essence, the Galichon–Salanié (henceforth G-S) model specifies a structure on the match problem and uses the observed covariation between different partner characteristics to generate preference parameters used to produce marital surplus.

To outline the model more precisely, we first summarize G-S assumptions as follows: G-S take matched couples such that each man (woman) is matched to one and only one woman (man) and assume discrete observable types in a sample of N men and women. Each partner's full type is comprised of both an observable type and an idiosyncratic element not observed by the analyst, such that males' and females' full type may be specified as $\tilde{x} = (x, \varepsilon)$ and $\tilde{y} = (y, \eta)$, respectively, with observables types x and y and idiosyncratic components ε and η. The marginal distributions for men and women are denoted $\tilde{p}(\tilde{x})$ and $\tilde{q}(\tilde{y})$, respectively, with $p(x)$ and $q(y)$ as the marginal distributions of the observable types. The set of feasible matchings (or joint characteristics of couples) is determined from the marginal distributions of female and male characteristics and is denoted to be $\mathcal{M}(\tilde{P}, \tilde{Q})$. The joint distribution of types $\tilde{\Pi}(\tilde{x}, \tilde{y})$ specifies the overall match, or "who marries whom," with $\tilde{\Pi}(\tilde{x}, \tilde{y}) \in \mathcal{M}(\tilde{P}, \tilde{Q})$ naturally. Similarly, the match on observable types is specified as $\Pi(x,y)$. G-S further rule out asymmetric information, assuming that the full type of each partner is observed in the marriage market.

G-S assume transferable utility, denoting a matching of a man of type $\tilde{x}$ and a woman of type $\tilde{y}$ to generate a joint surplus of $\tilde{\phi}(\tilde{x}, \tilde{y})$. This joint surplus is also assumed to exhibit additive separability, so that the joint surplus may be written as $\tilde{\phi}(\tilde{x}, \tilde{y}) = \phi(x, y) + \chi(\tilde{x}, y) + \xi(x, \tilde{y})$, where $\phi(x,y)$ is the deterministic surplus on observable types x and y, and $\chi(\tilde{x}, y)$ and $\xi(x, \tilde{y})$ represent unobservable contributions to joint surplus of men and women, respectively. This separability assumption implies that a man of full type $\tilde{x}$ will be indifferent between all women of observed type y, regardless of their unobserved characteristics. Equivalently, separability assumes no unobservable component to joint surplus, such as $\in(\tilde{x}, \tilde{y})$, ruling out a correlation between unobserved types.

This joint surplus, $\tilde{\phi}(\tilde{x}, \tilde{y})$, can be thought of as consisting of the sum of partners' marriage utilities, such that $\phi(x,y) = U(x,y) + V(x,y)$, where $U(x,y)$ and $V(x,y)$ denote deterministic male and female utility from the match, respectively, and males' overall utility from the match consists of $U(x,y) + \chi(\tilde{x}, y)$, with the corresponding utility for females equal to $V(x,y) + \xi(x, \tilde{y})$. Finally, to render the problem tractable, G-S assumes that all error terms follow a type I extreme value structure, giving the utilities a multinomial logit structure.

Given the above assumptions and following standard matching theory, the match under transferable utility must maximize social surplus. Following G-S, we denote this social surplus to be as follows:

$$\mathcal{W} = \sup_{\tilde{\pi} \in \mathcal{M}(\tilde{P}, \tilde{Q})} E_{\tilde{\pi}}\left[\tilde{\phi}(\tilde{x}, \tilde{y})\right]$$

The overall aim is to use the marginal probabilities and joint match distribution to estimate $\phi(x,y)$, the observed surplus.

Following G-S, we specify the observable surplus, $\phi(x,y)$, as a linear function of observable types X and Y, so that

$$\Phi_\Lambda(X, Y) = \Sigma_{k=1}^{K} \Lambda_k \varphi_k(X, Y) \quad (1)$$

[1] Unfortunately, our data do not contain measures of parental inputs over time, so we are unable to estimate a dynamic model of parental inputs into child production.

[2] Becker identified patterns in earnings as an element that did not fit his model of matching particularly well. While the theory suggests a negative correlation between partners' earnings or characteristics that are close substitutes in home production, this is often not the case in data. Selection may explain some of the inconsistency (Liu and Zhang, 2003).