How “Chicagoan” are Gary Becker’s Economic Models of Marriage? 1

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ABSTRACT

This paper examines Gary Becker’s theoretical modeling of marriage, including optimal sorting models, simple demand and supply models, and a Marshallian model comparable to partial equilibrium models of labor markets. Even though they are less compatible with Chicago price theory, Becker relies principally on optimal sorting models in articles he published in the JPE (Becker 1973, 1974) and a book, the Treatise on the Family (Becker 1981). This paper offers a number of possible explanations for Becker’s lack of emphasis on Marshallian partial equilibrium models in line with what is widely known as “Chicago price theory”. A number of alternative explanations are reviewed, including difficulty in applying Marshallian analysis based on prices to the subject of marriage. The most convincing explanation is that at the time he was writing his theory of marriage Becker was influenced by an intellectual environment placing increasing emphasis on mathematical models such as the optimal sorting models highlighted in Becker’s theory of marriage.

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This Chicago-style approach, sometimes known as “Price Theory” because of the fundamental role that prices often play, is exemplified in the path-breaking work of Gary Becker, Ronald Coase, Milton Friedman, Sherwin Rosen, George Stigler, and many others. Price theory has shed light not only on the most fundamental topics of traditional economics (e.g., consumption, saving, taxation, regulation), but also pioneered the use of economic tools in studying a wide range of other human behavior (e.g., crime and corruption, discrimination, marriage).

Mission statement prior to the inaugural conference at the Gary S. Becker Center on Chicago Price Theory, April 2006.

I. Introduction

Starting with Frank Knight and Jacob Viner, and under the intellectual influence of Milton Friedman, the Chicago School of Economics became a mecca of Marshallian price theory emphasizing partial equilibrium market analysis (Medema 2007, Van Overtveldt 2007). Gary Becker, who was a student of both Viner and Friedman, is viewed as a torchbearer of the Chicago approach to price theory. For instance, Van Overtveldt, who defines the Chicago School in terms of “a belief that the price mechanism is the key element in successfully solving economic problems” (Van Overtveldt 2007, p. 76), finds this Chicago approach “carried to its highest point by Milton Friedman and Gary Becker” (ibid.). Medema (2007) places Becker in the second generation epitomized by the work of Friedman and George Stigler. Melvin Reder (1982, p.33) places Becker in the Chicago tradition in labor economics started by Gregg Lewis.

At the same time most scholars agree (e.g., Fuchs 1994, Lazear 2000, Medema (2007), and Van Overtveldt 2007) that Becker played a central role in the expansion of economics that has been associated with Chicago. Becker’s seminal work on discrimination, family, crime, and political behavior has permanently widened the scope of economics at Chicago and elsewhere. However, in applying economic analysis to these new applications, Becker has diverged more from the Marshallian approach to price theory typically associated with Chicago economics than one would expect from an economist bearing the Chicago torch. This paper argues that at least in the case of one of the new applications of economics he pioneered, the economics of marriage, Becker developed models more consistent with central planning than with Marshallian partial equilibrium analysis.

The economics of marriage may not be a core topic in economics, but it occupies a prominent place in Becker’s work. His research on the family was singled out as one of his major contributions by the committee that awarded him the Nobel Prize in 1992, and the economics of marriage takes a prominent place in Becker’s work on the family: the first article on the family that he published in a major journal is his theory of marriage (Becker 1973,1974), and the chapters on marriage in his influential Treatise on the Family (Becker 1981, 1991) come first.

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2 Becker’s earlier economic analysis of fertility (Becker 1960) appeared in a conference volume published by Princeton University Press and NBER.

3 Becker’s Treatise on the Family (Becker 1981, 1991) is Becker’s most cited item. According to Google Scholar, on August 22, 2008 the two editions of the Treatise on the Family had been cited 5554 times. In comparison, Becker’s second most cited item, his book Human Capital (Becker 1964), had been cited 4230 times.
The next section discusses Becker’s models of marriage in light of Chicago price theory. Section III presents his optimal sorting models and discusses what is “un-Chicagoan” about them. This article asks why Becker did not place more emphasis on Marshallian partial equilibrium models in his theoretical work on marriage. The answer suggested in section IV is that the subject matter does not lend itself to Marshallian analysis. That answer is rejected on the basis of the many analyses of marriage that have been published and written in a more Chicagoan mode than Becker’s theory. Section V then examines alternative explanations.

II. Becker’s Models of Marriage and Chicago Price Theory

Other than a brief note published by Martin Bronfenbrenner in 1971 and unpublished papers by Becker’s students Reuben Gronau (1970) and Fredericka Pickford-Santos (1970) Becker’s article “A Theory of Marriage Part I” published in the Journal of Political Economy (JPE) in 1973 pioneered the economics of marriage. The article’s title is misleading, for it contains not one but a number of theoretical models. Most of the same models are also found in the chapters on marriage in the Treatise on the Family (principally Chapters 3 and 4 in Becker 1981). The various models of marriage all share the view that marriages are firms involved in production and can thus be categorized as part of the New Home Economics that Becker pioneered with Jacob Mincer while both were at Columbia in the 1960s (Grossbard-Shechtman 2001).

All of Becker’s models of marriage consider individuals as rational optimizers and therefore fit well with Becker’s contribution as a proponent of rational choice. The economics of marriage is part of Becker’s broad agenda involving applications of his theoretical approach “to all human behavior, be it behavior involving money prices or imputed shadow prices” (Becker 1976, p. 8). This agenda helps explain why Becker called the textbook he developed for his graduate classes in price theory “Economic Theory” (Becker 1971) whereas Friedman, whose course Becker took over at Chicago, authored a textbook entitled “Price Theory” (Friedman 1962). Soon after the original articles on marriage appeared in the Journal of Political Economy, Becker had his theory of marriage reprinted in the Economic Approach to Human Behavior (Becker 1976) which also included a number of other novel applications of economics, such as crime and politics. In the introduction to that volume he wrote:

The combined assumptions of maximizing behavior, market equilibrium, and stable preferences, used relentlessly and unflinchingly, form the heart of the economic approach as I see it (Becker 1976, p. 5).

In the context of the Marshallian models so central to Chicago price theory, ‘market equilibrium’ needs to be interpreted as ‘partial equilibrium’, not ‘general equilibrium’. In his theory of marriage Becker includes some Marshallian models, but his reliance on such models is far from relentless.

Becker’s (1973, 1981) theory of marriage addresses two major questions: allocation or sorting of men and women into marriages and distribution of the gains from marriage among them. Whether the agents needing a match are workers and firms, house sellers and buyers, hospitals and doctors, or brides and grooms, allocation is a crucial outcome studied by

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4 The second edition of the Treatise, published in 1991, is identical to the first except for a new introduction.
economists. As emphasized in Friedman (1962), the main mechanisms facilitating allocation or sorting are command and market, and markets function thanks to a price mechanism.

As expected from a product of Chicago economics, Becker’s theory of marriage includes some market equilibrium theory in which prices serve as a mechanism for reaching allocative equilibrium. In Becker (1973, Figure 2) this includes a Marshallian partial equilibrium model with multiple types of men and women participating in separate but interrelated markets. Each market is composed of homogeneous women and homogeneous men, as in the basic Marshallian model. In more modern terminology, this model can be labeled as “hedonic”.

Each market establishes an equilibrium price and quantity that depend on the number of participating men and women and on substitutability between various types of potential spouses. Before presenting this model, Becker (1973) develops a demand and supply analysis with one type of man and one type of woman. These market equilibrium models of marriage based on Demand and Supply analysis deal with the allocation problem even though Becker (1973) emphasizes their use in analyzing intra-marriage distribution problems by placing them in a section entitled ‘Division of Output Between Mates’.

These demand and supply models of marriage get the short shrift in Becker’s theory of marriage. As is usually the case in price theory, he addresses the problem of allocation before he gets to that of distribution, and to analyze allocation or sorting he relies on optimal sorting models that are far from Marshallian economics. In Becker (1973 reprinted in Becker 1976, p. 214) optimal sorting models come before demand and supply models of marriage (Becker 1973 reprinted in Becker 1976, p. 228). Becker (1973) gives limited weight to the model most compatible with Chicago price theory, the Marshallian partial equilibrium model, by placing it after optimal sorting and simplistic demand and supply models. The Marshallian model fares even worse in the Treatise on the Family (Becker 1981), from which it is removed altogether. Furthermore, a reader of the Treatise could easily form the erroneous impression that demand and supply models of marriage are relevant only in a polygamous society, for they are placed in a chapter on polygamy. Both versions of Becker’s theory of marriage clearly emphasize optimal sorting models. As discussed in the next section, these models are further from Chicago price theory.

III. Becker’s Optimal Sorting Models of Marriage

In Becker (1973) optimal sorting models are presented to analyze the allocation of men and women into marriage. Likewise, in Becker (1981) the chapter on “Assortative Mating in Marriage Markets” is mostly devoted to optimal sorting models. In line with other

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5 Rao (1993) is possibly the first to use the term ‘hedonic’ to describe this kind of multi-market Marshallian model. Hedonic markets were first introduced by Sherwin Rosen (1974).

6 Earlier sections of the 1973 article are entitled: ‘the Gain from Marriage’, and ‘the Marriage Market and Sorting of Mates’. The second JPE article (1974) includes a section entitled ‘Love, Caring, and Marriage,’ a short section on polygamy (2 ½ pages, in contrast to an entire chapter in the Treatise), a section on assortative mating and natural selection, and a section on life-cycle marital patterns that includes an economic analysis of search in marriage markets.

7 However, Becker (1981) contains two versions of the simple demand and supply model assuming homogeneity (Figures 3.1 and 3.2) and adds another basic model with two types of men and one type of woman (Figure 3.3). Becker’s last analytical publication on marriage is a chapter with Kevin Murphy in their book Social Economics (2000). This chapter includes a sorting model of marriage and no Marshallian model.

8 The Treatise (1981) also offers an analysis of altruism in the family (Chapter 8), of analogies between mating among humans and among other species (Chapter 9), of divorce (Chapter 10), and some explanations for changes in family characteristics in a number of industrialized countries in the period between 1950 and 1978 (Chapter 11).
optimal sorting models found in the literature, Becker’s optimal sorting models assume that all men are different and can be ranked in terms of their potential productivity in marriage, and that the same holds for women. A matrix shows the maximum household output that can be produced by all combinations of men and women. Becker then relies on Tjalling Koopmans and Martin Beckman’s (1957) theory of optimal assignments, “which has the same structure as the sorting of persons by marriage” (Becker 1973 reprinted in Becker 1976, p. 215), to derive an optimal sorting involving a core.

In the Treatise Becker (1981) basically repeats the 1973 analysis of optimal sorting based on Koopmans and Beckman, but adds sections on sorting with unequal numbers of men and women, differences in preferences, assortative mating with polygamy, and price flexibility. This additional material includes the concept of “equilibrium sorting”, a term closer to the Marshallian equilibrium market model of allocation than the term “optimal sorting”, and addresses the problem of distribution (Becker 1981, p. 80).

Even though Becker (1973) mentions explicit prices and recognizes that they add to the fluidity of the division of marital output (Becker 1973 reprinted in Becker 1976, p. 228), he prefers not to give much space to the analysis of bride prices and dowry. Likewise, the section on price flexibility in the chapter on assortative mating in Becker (1981) is short and omits references to most of the economic analyses then available on the price of marriage (see next section).

Optimal sorting models are incompatible with Marshallian analysis to the extent that they don’t rely on a price mechanism to achieve equilibrium and that the assumption of complete heterogeneity limits potential competition among mates. Becker’s optimal sorting models don’t take him as far from Chicago price theory as would be the case if he had used optimal sorting models more consistent with central planning. The ‘assignment problems’ of Koopmans and Beckman (1957) that inspired Becker are not as far from Marshallian models as are the ‘stable marriage problems of David Gale and Lloyd Shapley (1962), to which Becker (1981) contrasts his analysis. Optimal sorting models based on Gale and Shapley have been used by central planners allocating medical residents among competing hospitals.9 As shown e.g. by Werner Hildenbrand (1982), some sorting models converge towards competitive equilibria.10 Ultimately, however, Marshallian models utilizing a price mechanism and optimal sorting models compete with each other. Becker (1981, p. 85) recognizes that if marital prices were flexible, optimal sorting models would be “irrelevant to actual marital sortings.”

Optimal sorting models are particularly limited in their ability to deal with the basic economic problem of distribution. As a result, economists interested in intra-marriage distribution problems have turned to other types of models, bargaining models based on game theory in particular: after Becker’s Treatise the second most popular publication analyzing the economics of marriage is Marjorie McElroy and Mary Jane Horney’s (1981) bargaining model of marriage, in which two agents decide on distribution and production according to some kind of bilateral monopoly game.11 Such bargaining models clearly diverge from Chicago price theory emphasizing market competition.

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9 I owe this point to Valerio Filoso.
10 I owe this point to William A. Brock.
Why didn’t Becker place more emphasis on Marshallian partial equilibrium models in his theoretical work on marriage? The first possible answer is that the subject matter does not lend itself to Marshallian analysis.

IV. Can Marshallian Models Explain Marriage?

In principle, Becker could have used his Marshallian model to analyze both distribution and allocation problems, giving the model a central place in both the 1973 article and the 1981 *Treatise*. This is what other analysts of marriage influenced by Chicago price theory have done. In 1971 Martin Bronfenbrenner, who had obtained his Ph.D at Chicago in 1939, published a brief Marshallian analysis of Indian marriage markets using explicit bride prices and dowries. Models with these explicit prices have also been the focus of later work on the economic analysis of premarital monetary transfers, such as Grossbard (1978a), Papps (1983), Botticini and Siow (1993), and Rao (1993).

Becker’s optimal sorting models found few followers among the younger researchers entering the field of economics of marriage as a result of Becker’s influence. In contrast, they were attracted by Marshallian models of marriage. This holds for three students of Becker who studied at Chicago in the 1970s, while Becker was working on the economics of marriage: Alan Freiden, Michael Keeley, and Amyra Grossbard. Freiden (1972, 1974) estimated an empirical model of marriage rates using data for U.S. states. He explained allocation into marriage as a function of factors that can be interpreted as shifting the demand or supply of grooms in a market for brides. Michael Keeley (1974, 1977) developed a search theory based on the concept of ‘marital wage’ defined as the equilibrium value of a spouse in his or her marriage market. Grossbard (1976) used the term ‘wife-wage’ in her analysis of polygamy in Nigeria (see also Grossbard 1978b). This wife-wage was later generalized to the gender-neutral ‘quasi-wage’ and applied to the analysis of labor force participation (see Grossbard-Shechtman 1984, 1993). Keeley’s ‘marital wage’ and Grossbard’s ‘quasi-wage’ indicate the price of a person participating in a marriage market.

Others who entered the field at that time and were influenced by Becker’s theory of marriage also preferred Marshallian analyses. Lisa Landes, who had been Becker’s student at Columbia in the 1960s and worked with Becker on an analysis of divorce (the third author being another of Becker’s former students at Columbia, Robert T. Michael, see Becker, Landes and Michael 1977), published an empirical piece on another price related to marriage and divorce, namely alimony. It was published at Chicago, in the *Journal of Legal Studies* (Landes 1978), right around the time Becker was writing the *Treatise*, and remarkably, it is not cited in the *Treatise*. Elizabeth Peters (1986), who studied at Chicago in the 1980s after the *Treatise*’s publication, also used price theory in her analysis of alimony. The same holds for Bertrand Lemennicier, who was influenced by Becker’s theory of marriage in France in the 1970s and presented a paper to Becker’s workshop on applications of economics in 1977 on the topic of division of labor within the family and its impact on gains of marriage and potential divorces (later published as Lemennicier 1980). Lemennicier (1988, Chapter 4 *Le Prix de la Femme dans nos Societes Contemporaines* [the price of women in our contemporary societies]) contains an analysis of alimony compatible with Marshallian analysis.

On a number of issues Becker’s disciples have been closer to Chicago price theory than their professor has. For instance, Keeley (1977) and Becker, Landes, and Michael (1977) of two-person models of marriage (see, for instance, Angus Deaton, Javier Ruiz-Castillo and Duncan Thomas 1989; John Hoddinott and Lawrence Haddad 1995).

12 Grossbard, Papps and Siow all obtained their doctorates in economics at the University of Chicago.
were published the same year and both derive predictions from search theory, such as the prediction that individuals with rare characteristics may be less attractive relative to people with more generally desired characteristics. Keeley tests his theory with data on age at marriage, whereas Becker et al study divorce. The exposition by Keeley, Becker’s student, relies more on an explicit price mechanism than that by Becker and his co-authors.

Another example: Becker (1973), Grossbard-Shechtman (1984) and Lemennicier (1988, p. 79) write on the opportunity cost of time of those working in marital household production. As evident from the following passage, Becker (1973) considers wages in the labor force as the price of time of household producers who are either married or considering marriage:

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\text{...the ‘shadow’ price of an hour of } t_f \text{ [female household production time] to a single M [male]—the price he would be willing to pay for } t_f \text{ —would exceed } w_f \text{ [the female wage], and the ‘shadow’ price of an hour of } t_m \text{ [male household production time] to a single F [female]—the price she would be willing to pay for } t_m \text{ —would exceed } w_m \text{ [the male wage]. Both gain from marriage because M then, in effect, can buy an hour of } t_f \text{ at } w_f \text{ and F can buy an hour of } t_m \text{ at } w_m \text{, lower prices they then would be willing to pay. Of course this is also why married households use positive amounts of } t_f \text{ and } t_m. (Becker 1973 reprinted in Becker 1976, pp. 210-211)}
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Becker’s (1973, 1981) discussion of opportunity cost of home producers’ time is disconnected from Marshallian models aimed at explaining intra-household distribution of income. The implicit prices in the Marshallian models, which Becker labels “unmeasurable shares of the gain from marriage received by men or women” and “equilibrium income [from marriage] that men and women obtain”, are presented well after the introduction of opportunity costs of household production (in an earlier section in Becker 1973) and in an earlier chapter in Becker 1981). When he introduces the concept of “salary” Becker seems to get closer to an explicit price mechanism linking production and distribution:

Each marriage can be considered a two-person firm with either member being the “entrepreneur” who “hires” the other at the “salary” \( m_j \) or \( f_j \) and receives residual “profits” (…). Another interpretation of the optimal sorting is that only it enables each “entrepreneur” to maximize “profits” for given “salaries” of mates…Becker 1973 reprinted in Becker 1976, p. 216) [quotation marks in the original].

However, Becker (1973) stops before using the concept of “salary” the way that prices are used in in Marshallian models, and he drops the term “salary” altogether in the Treatise. In Becker (1973) these “salaries” don’t indicate opportunity costs of time and therefore don’t drive allocative decisions, such as choice of mate or investment in a mate’s earning capacity. In contrast, two of his disciples linked the concept of opportunity cost of work in marital household production with the opportunity cost of marriage and modeled these wages as a function of marriage market conditions (Grossbard-Shechtman 1984, Lemennicier 1988, and Grossbard-Shechtman and Lemennicier 1999).

A third example regards investments in a spouse’s human capital. Becker, Landes and Michael (1977) recognize that individuals invest in human capital related to productivity in marriage. They present the concept of marriage-specific investments, defined as ‘an

\[\text{13 In an email to the author, Becker (2004) uses the term ‘imputations.’}\]
investment that raises the output produced in a particular marriage.’ In his theory of marriage Becker (1973, 1981) did not mention literature suggesting that women invest in their husbands’ human capital, leading to husbands’ higher wages and better health, even though some findings then known to him supported such view: his Columbia student Michael Grossman (1976) had found that marriage to a more educated spouse is associated with higher individual health, and Lee Benham (1974) had shown that women benefit their husbands’ wages more than vice-versa.

Grossbard-Shechtman (1986) and Lemennicier (1988, Chapter 4 Le Prix de la Femme dans nos Societies Contemporaines [the price of women in contemporary societies]) integrate the findings by Benham and Grossman in their theoretical modeling of marriage, viewing them as instances of women’s marital household work contributing to men’s human capital by raising their earnings capacity or health. Such human capital explanation follows easily from the assumption that marital household workers are paid “wages” by their spouses and from the human capital literature in which higher wages act as incentives for investing in human capital, one’s own or a firm’s. Not interpreting his marriage “salaries” as more conventional wages leads Becker to miss the insights that follow from an integration between Marshallian models of marriage and theories of investment in human capital.

These examples demonstrate that Becker could have possibly introduced more Marshallian reasoning into his economic theories of marriage. Why then did Becker limit his use of such models?

V. Other Possible Explanations

No explanation as to why he wrote as he did on these topics is available. An answer to why he omitted the hedonic Marshallian model from the Treatise could have given us a clue to the evolution of his thinking. However, when asked why he omitted that model from the Treatise, Becker’s answer did not reveal much: “My Treatise was considered by me to be a complement to my previous work, not a substitute. So I did not go over everything in the earlier papers that I considered to be valid and sometimes even important.” (Becker, 2004)

In that same email exchange, Becker stated that he had not changed his mind about the validity and applicability of demand and supply models to the study of marriage: “I never abandoned my view that imputations to men and women are determined by a competitive marriage market - what you call the ‘supply demand’ framework.” It is thus necessary to look for more satisfying explanations.

Could Becker’s lack of enthusiasm for Marshallian models of marriage be explained in terms of his motivation to attract the interest of sociologists? From the start, Becker wanted his work on marriage and the family to reach sociologists (see the preface to the Treatise). In part, Becker called his book a Treatise because he wanted to avoid a title containing the word ‘economic’.14 In the late 1970s, when Becker was working on the Treatise and his work was being published exclusively in economics venues, sociologists had not yet taken an interest in Becker's ideas about the family. When the Treatise was being prepared there was some antagonism to economists’ entry into a domain traditionally allocated to sociologists (see, for instance, Remi Clignet and Joyce Sween 1977). At that time even his sociology colleagues at Chicago who researched the family paid little attention to Becker's theories on the topic. Given that the family has traditionally been a topic studied by

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14 Based on conversations with Becker in the years 1974-1976. He did not call it a ‘treatise’ to imply that it replaced earlier articles, including the JPE article emphasizing Marshallian models of marriage. This is how it was perceived by Sarah Hamersma, a recent Ph.D in economics.
sociologists, Becker wanted the *Treatise* to make his theory of marriage more appealing to sociologists. This motivation to reach out to sociologists may also have led Becker to avoid statements, assumptions, and jargon likely to alienate readers not trained in economics. To the extent that optimal sorting models are easier for sociologists trained in mathematics than Marshallian models typically not taught outside economics department, this could explain Becker’s preference for optimal sorting models.

Could Becker have wanted to appeal to the trend towards more mathematical theoretical models, a trend spreading in the economics profession in the 1970s? The use of both optimal sorting and bargaining models in the profession was growing in the 1970s. Becker’s theory of marriage openly endorses optimal sorting models and Becker expressed little discontent with the bargaining models of marriage attempting to replace his Marshallian models of division of marital income.

Becker’s principal model of marriage is an optimal sorting model based on Koopmans and Beckman (1957). During Becker’s student days Koopmans was in Chicago as a member of the Cowles Commission, a research group that emphasized general equilibrium theory and econometric analysis and thereby distanced itself from Chicago price theory (Van Overtveld 2007). Could it be that Becker was exposed to Koopmans’ ideas in his student days and that they influenced him? Becker has never mentioned that he was exposed to Koopmans’ ideas, but he has written about his exposure to game theory as an undergraduate at Princeton (see Becker 2007). Game theoretical models are among the other major mathematical models which invaded economics in the 1970s, after Becker moved to Chicago from Columbia in 1969.

This exposure to game theory and a possible desire to appeal to younger generations of economists help explain why, even though Becker bypassed bargaining models in his theory of marriage, he has barely responded to criticisms by bargaining theorists of what is now known as his ‘unitary’ models of household decision-making (e.g. Browning et al. 1994 and Pollak 2003). Prior to his theory of marriage Becker’s models of the family were unitary in the sense that they assumed a single household utility function, a single budget constraint, and a single household production function.16 Bargaining theorists of marriage have contrasted their own theories with Becker’s unitary model without acknowledging that Becker’s Marshallian models of marriage also assume that husband and wife have separate utility functions and help explain intra-marriage distribution of income. While Becker has recognized in private that those who criticize his unitary household models ignore his Marshallian models of marriage addressing distribution problems in marriage (Becker 1993), he has refrained from responding publicly to such critiques. He even invited Marjorie McElroy, one of the first economists to publish a two-person theory of marriage, to come for a post-doc at Chicago in the period 1979-1981. During that time she presented her not-yet-published bargaining analysis of marriage (co-authored with her student Mary Jean Horney and published in 1981) in Becker’s workshop in applications of economics.

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15 Becker’s efforts at reaching out to sociologists of marriage were hugely successful: Becker has achieved undeniable prominence among quantitative sociologists and demographers studying marriage. That the study of marriage is primarily a field dominated by sociologists helps explain Becker’s enormous prominence in quantitative research on marriage, whether generated by sociologists or economists. Few articles on marriage by sociologists or demographers are currently published without a reference to Becker. One of the reasons that Becker is among the most cited economists in the world is that his citations also come from social scientists outside economics (not only those who write on marriage), and sociologists tend to cite more than economists.

16 E.g. Becker (1965). The same holds for the work of Mincer (e.g. Mincer 1963).

A reflection of the growth in the popularity of mathematical economics is William A. Brock’s arrival at Chicago in 1972. Tellingly, Becker (1973, 1974) engaged his help with a mathematical appendix to his optimal sorting models of marriage. In shifting away from Marshallian models of marriage Becker may thus have responded to the prevalent intellectual environment among younger faculty members at Chicago.\(^{17}\) Robert Barro, another young economist specialized in mathematical models, arrived at Chicago in 1972. He and Becker obviously interacted, eventually publishing papers together after Barro left for Harvard in 1984 (Becker and Barro 1988, 1989). James J. Heckman, who arrived as an assistant professor in 1973, also raised the level of mathematical sophistication in the department of economics at Chicago in general, and in the labor economics program in particular. As for Robert Lucas, who joined the department in 1974, he also excels in mathematical modeling. Sherwin Rosen arrived in Chicago in 1977. He had also been trained at Chicago, was a close friend of Becker, and became his partner in running the workshop in applications to economics. Rosen also participated in the new trend away from Marshallian economics, as he authored some game-theoretical models, including one with Edward Lazear, who also arrived at Chicago in the 1970s as an assistant professor (Lazear and Rosen 1981).\(^{18}\) Becker acknowledges Rosen in the *Treatise* for useful and detailed suggestions on all the chapters. Furthermore, Rosen’s (1981) model of superstars had a significant impact on the chapter on polygamy.

While mathematical economists were gaining influence, the old guardians of Chicago price theory were losing their influence in the economics department at Chicago in the 1970s. When Becker returned to Chicago in 1969 three of the professors he had been closest to in the 1950s, when he was a graduate student and assistant professor, were still active in the department of economics: Friedman, H. Gregg Lewis, and T.W. Schultz. Becker respected them and they had stood behind him when he wrote on the economics of discrimination in the 1950s (Becker 1992). Becker has called Friedman his most influential mentor (see Becker 2006). Gregg Lewis, whose seminar in research in labor economics he had attended while in graduate school, had been Becker’s principal advisor on his dissertation. Gregg Lewis has been called the father of Modern Labor Economics by Mincer (2006) and the founder of the Chicago School of Labor Economics by Becker (1976). As chair of the department, Schultz had been influential in the 1950s (see Emmett 2007). His work on human capital inspired both Becker and Mincer (who arrived as a post-doc at Chicago in 1957).

Friedman, Gregg Lewis and Schultz are closely associated with Chicago price theory, supported Becker as he developed his ideas on economics of marriage and the family, and attended Becker’s workshop in applications of economics in the early seventies. These mentors’ influence was waning during the 1970s: Schultz retired in the early 1970s and by the mid-seventies Friedman left Chicago for the Hoover Institute and Gregg Lewis for Duke. Gregg Lewis’ departure helps explain the further withdrawal from Chicago price theory noticeable in a comparison of Becker (1973) and Becker (1981): Gregg Lewis

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17 Another example of Becker’s changed approach is that he dropped the assumption of stable preferences, another principle Becker emphasized in 1976, in Becker and Murphy (1986). Kevin Murphy, who was Becker’s student in the 1980s, became his colleague soon after.

18 Lazear has a Ph.D. from Harvard, but his principal advisor, Zvi Griliches, had spent many years teaching at Chicago.
contributed part of the technical appendix to Becker’s 1973 theory of marriage and read all of Becker’s early work on marriage very carefully, integrating ideas from these articles in his own courses in labor economics. In the early 1970s Becker and Gregg Lewis (1973) co-authored a theoretical paper on the trade-off between child quality and number of children, their model resting on traditional price theory.

By 1975 labor economics at Chicago had moved away from Marshallian models, with Jim Heckman pulling it in the direction of econometrics and Lazear and Rosen towards game theory. This changing intellectual environment may have influenced Becker; Becker may have influenced who was hired at Chicago; or exogeneous factors could have influenced both Becker and the rest of the department at Chicago.

VI. Conclusions

This paper has documented the variety characterizing Becker’s theoretical modeling of marriage: his ‘theory’ contains optimal sorting models, simple demand and supply models, and a Marshallian model comparable to partial equilibrium models of labor markets. Even though they are less compatible with Chicago price theory, optimal sorting models are highlighted in the two principal versions of Becker’s theory of marriage: the articles published in the *JPE* and the *Treatise on the Family* (Becker 1981).

Given the emphasis on Marshallian partial equilibrium models in Chicago price theory, Becker’s choice to emphasize optimal sorting is puzzling. This paper addresses a number of possible explanations. Other scholars, including many students of Becker, have used Marshallian models of marriage more extensively than Becker. This implies that an explanation of Becker’s choice of model based on the nature of marriage-related problems is not convincing. A number of alternative explanations have been reviewed. The most convincing one is that Becker was influenced by his intellectual environment and preferred to emphasize optimal sorting models, mathematical models that became more popular in the 1970s and 1980s. He also refrained from criticizing another category of mathematical models that experienced fast growth in the 1980s: bargaining models of household decision-making in marriage, even though these models ignored Becker’s own Marshallian models capable of solving some of the same problems.

More research on Becker’s theory of marriage and its evolution is needed, including analyses of the chapter on marriage in Becker and Murphy (2000). We also need more research comparing the various theories of marriage dealing with allocation and distribution. It would be interesting to compare Becker’s theories of marriage to other theories he has developed over his productive lifetime. Finally, it is hoped that others will compare the compatibility between Becker’s theories and Chicago price theory with the degree to which others at Chicago and elsewhere have upheld the principles of Marshallian analysis.

REFERENCES


19 Two quarterly courses in labor economics that Gregg Lewis taught in 1974 included extensive references to Becker’s theories on the family.


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