

The new economics of human behavior

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6 Marriage market models¹

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In 1973, while a first-year graduate student at the University of Chicago, I first became acquainted with Becker's economics of marriage. It was not love at first sight. Some of my fellow students and I thought it was weird to analyze love with economic theories. I still remember how we giggled when we first read a mimeographed version of Becker's theory of marriage prior to its publication. A year later, my attitude started to change. I had become interested in anthropology and had difficulty finding a dissertation topic related to primitive societies. T. W. Schultz - who had been a helpful mentor ail along - then offered me access to a perfect data set for an economic analysis of polygamy, a study he was sure Becker would gladly supervise. What started as a hesitating exploration into Becker's controversial theory of marriage soon became the focal point of my career.

Two decades of research later, I realize that Becker's theory of marriage is one of his most important scientific contributions. It has inspired a number of valuable insights and results, some of which are presented in this chapter. In particular, this chapter discusses insights derived from Becker's original theory of marriage regarding the effects of no-fault divorce laws and the effects of marriage market conditions on consumption and labor supply. Two market models of marriage are presented: Becker's original theory and my own version of that theory.

The value of Becker's theory of marriage is far from being universally recognized. Economic models of marriage and divorce have often been labeled as esoteric and outside of mainstream economics. Many people still giggle when they see marriage decisions modeled in terms of utility functions. When modeling labor supply, consumption, and fertility, most economists use two other kinds of models: pooled household models - often labeled neoclassical models - and game-theoretic models of household decision making (also called household bargaining models). This chapter concludes with a comparison between these three alternative theories: Becker's theory of marriage, pooled household models, and game-theoretic models.

Two basic tools

When it was published in 1973 and 1974, Becker's theory of marriage was the first application of economic theory to the analysis of marriage. Like most great ideas, the basic idea in Becker's theory of marriage is simple. It consists of applying two basic tools of economic analysis to the area of marriage: cost-benefit analysis (or rational choice theory) and market analysis. The assumption of rational choice is widely used in economics, both in traditional areas of application such as the theory of the firm and in novel areas of application (including other analyses pioneered by Becker such as the economics of fertility and crime). Accordingly, individuals are viewed as rational agents who marry each other if they are better off married than single.

The economic analysis of marriage also draws on another major tool of economic analysis: market analysis. Whether we like to admit it or not, we are all part of some marriage market to the extent that we all are substitutable to some degree. Markets can operate whenever substitutes exist, whether these markets are visible or not. Sociologists, demographers, and anthropologists have recognized the existence of marriage markets for a long time. Becker derived new insights by applying basic demand and supply analysis of the kind usually applied to studies of firms and consumers.²

An application of Becker's theory of marriage which has received much attention is the analysis of the effects of a switch from 'divorce laws requiring either mutual consent or proof of fault to no-fault divorce laws.

No-fault divorce laws

The adoption of no-fault divorce laws by California in 1970 marks a dramatic change in the legal process of divorce in the United States. By 1987 all states had adopted some form of no-fault divorce law. When California was considering changing its divorce laws, no-fault divorce was hailed by women's groups and others as a civilized step that would put an end to the old fault-based system of divorce. For instance, Lenore Weitzman (1985) - a sociologist who has long been identified with feminist causes - admits to her early enthusiasm for the new divorce laws:

I saw California's law as an exciting experiment in legal reform. I . . . shared the reformers' optimism and assumed that only good could come from an end to the old fault-based system of divorce. The sham to

hostility between divorcing spouses. How much better to lessen the trauma of divorce for both parents and children. And how much better to end a marriage in a nonadversarial process that would enable the parties to fashion fair and equitable financial arrangements. If I, as a researcher, had a personal or political goal beyond my stated aim of analyzing the effects of the new law, it was to help potential reformers in other states to learn from the California experience.

In 1980, when Weitzman and co-author Ruth Dixon published some of their first results of an empirical investigation of the effects of the change in divorce laws in California, she still sounded like an advocate of no-fault divorce (Dixon and Weitzman, 1980). However, by then she had become disturbed by some of the results of her research. Unexpectedly to her, she found that after the passage of no-fault divorce there were dramatic declines in (1) the percent of wives awarded more than half the value of the house, household furnishings, cash, and stocks, (2) the percent of women receiving alimony, and (3) the standard of living of women after divorce, especially in comparison to the standard of living of men. While other researchers may not agree with the size of the effects of no-fault divorce estimated by Weitzman, there are other studies indicating that no-fault divorce worsened the financial situation of divorced women.³

Effect on financial well-being after divorce

These findings come as no surprise to anybody familiar with Becker's theory of marriage. Becker (1981,1992) has theorized that:

The switch to no-fault divorce laws is expected to have a negative effect on the material well-being of women after divorce.

The new laws gave a spouse a unilateral right to divorce, i.e., no consent was required from the spouse preferring the marriage to last. Under the old legal regime a spouse who wanted to stay married - i.e., a spouse losing from divorce - had a strong bargaining position in comparison with a spouse who wanted a divorce. Consequently, the losing spouse would be "bribed" into cooperating with the divorce procedures by receiving a higher portion of the family assets and privileges than would be the case if divorce could be obtained without the agreement of the losing spouse. Becker's theory implies that spouses who had more to lose from a divorce were more likely to be hurt by a switch from old divorce laws to no-fault divorce laws. The no-need-for-consent aspect of the new laws reduced the bargaining power of the spouse standing to lose from divorce.

There are a number of reasons why women may stand to lose more from a divorce than men, especially if they have devoted much of their marital life to home making and child rearing. As mentioned by Becker

(1981): (1) men typically do not get custody of children and thus are freer to find a new mate, and (2) men may have more opportunities to meet other women while still married. Furthermore, one can add that (3) women who devote time and other personal resources to home making pay an opportunity cost in terms of lost earning capacity at the time of divorce, and (4) as people age, sex ratios of marriage eligibles are increasingly in men's favor (men typically marry younger women much more than vice-versa, and women's life expectancy exceeds that of men). Therefore, women's marriage market conditions deteriorate faster than men's.

Under the old divorce laws based on either consent or fault, women with young children or older women who invested their whole life into a home-making career may not have cooperated with a divorce procedure initiated by their husband, unless they got generously compensated materially. Consequently, prior to the switch to no-fault divorce, many women in those situations would be "housekeepers" after a divorce, i.e., they would keep the house. It also follows that a switch to no-fault divorce laws would be associated with a decrease in real value of alimony and child support. By doing away with the need for consent, no-fault divorce laws reduced the bargaining power of spouses who stood to lose from a divorce, more often - the case for women than for men.

Having internalized Becker's theoretical analysis of the consequences of no-fault divorce, I tried to persuade Weitzman - when we were both at Stanford in 1981 - that the detrimental financial consequences of no-fault divorce laws for women were to be expected. By 1985, Weitzman had abandoned her earlier enthusiasm for no-fault divorce.

One can only speculate that if the detrimental financial consequences of no-fault divorce for women had been anticipated - based either on a theoretical analysis such as Becker's or on facts such as those collected by Weitzman - the laws would not have been passed in so many states. People concerned about women's rights and the future of marriage should give serious thought to Becker's (1992) proposal to replace the present divorce laws with laws requiring mutual consent.

Effect on divorce

Another interesting implication of Becker's theoretical analysis of marriage and divorce is his hypothesis that:

No-fault divorce would have no long-run effect on divorce rates.

Changes in divorce laws affect the relative bargaining position of individuals in marriage, but they do not affect the total gain from divorce. The law affects property rights, but it does not affect the decision to divorce.

This hypothesis was also confirmed by facts (Becker, 1981; Weitzman, 1985; Peters, 1986).

Effect on marriage

Furthermore, it is predicted that:

No-fault divorce laws will discourage marriage.

In order to explain this hypothesis, it is useful to think in terms of markets for spousal labor (see Grossbard-Shechtman, 1984,1993).

The G-version of Becker's theory of marriage

I developed the concept of spousal labor while writing my doctoral dissertation on the economics of polygamy in 1974. I read about the hard work involved in running a household in the Eastern part of Nigeria where my data had been collected. My ethnographic advisor, anthropologist Ronald Cohen, assured me that most women he had interviewed in polygamous households were glad to share the heavy burden of household work with another wife or other wives. Accordingly, I started looking at men as employers of women's spousal labor, and women as the suppliers of such labor. Such a perspective implied that most analytical tools used in traditional labor economics could simply be borrowed when analyzing marriage. This view of women as suppliers of spousal labor applies to our own culture and to men as well, especially if spousal labor is defined in broad terms (to include health care or counseling, for instance).

In this model men and women who can possibly marry each other thus participate in two markets: a market for female spousal labor where women are on the supply side and men on the demand side, and a market for male spousal labor supplied by men and demanded by women. Marriage decisions viewed as decisions regarding demand and supply of spousal labor can be analyzed very similarly to work and employment decisions. Accordingly, decisions women make are influenced by the decisions men make and vice-versa, due to their joint participation in the same markets. In addition, a special interdependence between a particular wife and a particular husband may develop after marriage, similarly to the special interdependence between a worker and a firm. Major differences between this particular application of labor economics and more traditional labor economics are that in the case of marriage (1) there tends to be only one worker and one employer, (2) the worker and the employer employ each other more symmetrically than in labor relations, and (3) costs of separation/divorce tend to be higher than in the case of other labor relations.

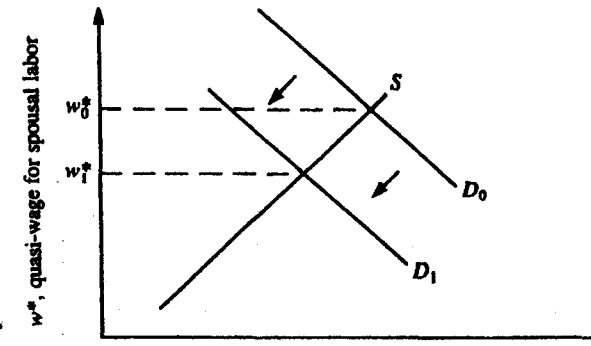


Figure 6.1 Effect of no-fault divorce laws on equilibrium in a market for women's spousal labor

Notes:

D_0 : men's demand under pre-1970 divorce laws.

D_1 : men's demand with no-fault divorce laws.

For simplicity of presentation, let us focus solely on the spousal labor supplied by women. Given that many women can potentially substitute for each other's spousal labor, and the same can be said for men (in this case in their capacity as employers of spousal labor), there will be markets for spousal labor. Figure 6.1 presents such a market. It has an aggregate upward-sloping supply of spousal labor by women. The demand for this spousal labor by men is downward sloping.

The market equilibrium obtained at the intersection of demand and supply determines both how many people marry and how much time they spend working in marriage. Graphically, both these dimensions of quantity supplied can be seen on the horizontal axis of figure 6.1. As in labor supply theory, a point on the aggregate supply can not specify simultaneously how many people work (in this case, enter marriage) and how much they work (in this case, how much they engage in spousal labor). As in other labor markets, average hours of work tend to be heavily influenced by institutional factors, including customs and cultural expectations.

As is the case with standard labor markets, markets for spousal labor also establish equilibrium wages, shown on the vertical axis of the spousal labor market depicted in figure 6.1. The non-observable compensation for spousal labor is called M^* , as it measures the value of time and w^* is the symbol economists often use for value of time.

When individual men and women employ each other as wife and husband they are initially influenced by the value of their spousal labor as determined in markets for spousal labor (marriage markets). After they

marry, their actual value of time may differ from that market value due to the existence of one-to-one ties and divorce costs.

Laws regulating marriage and divorce influence aggregate conditions in markets for spousal labor. Consider the impact of a law which lowers the financial well being of divorced women, such as no-fault divorce laws. Individual decisions regarding spousal labor are made sequentially. The decision to enter marriage, from the perspective of either demand or supply of spousal labor, will be based on expected benefits and costs at various future points in time. The expected benefits from marriage for a woman who intends to engage in substantial spousal labor over her lifetime consist of the present value of her earnings from supplying spousal labor as long as the marriage lasts *plus* the present value of her income as a result of a divorce (weighted by the likelihood of divorce). Men's demand for women's spousal labor also reflects their demand over the life cycle, including the possibility of a future divorce. Given that no-fault divorce laws have lowered the value of divorce settlements women can expect, they can be analyzed as lowering men's willingness to pay for spousal labor (in a particular form). This can be translated as a reduction in men's demand for spousal labor (for instance, from D_1 to D_2 in figure 6.1). Given that women have an upward-sloping supply of spousal labor (see figure 6.1) and that no-fault divorce laws cause a drop in demand, women will be less willing to marry after the passage of no-fault divorce laws than they were prior to the legal change. Also, the present value of the equilibrium compensation for women's spousal labor w^* is expected to decrease as a result of the introduction of no-fault divorce.

Evidence for the hypothesis that no-fault divorce laws have caused lower marriage rates is hard to establish. Marriage rates have definitely declined since 1970, but empirical studies are not available to determine what part of that decline can be attributed to the passage of no-fault divorce laws.

Effect on labor force participation

The same analysis also leads to a further hypothesis:

No-fault divorce laws are expected to encourage the labor force participation of married women.

If married women expect a lower financial settlement in case of divorce, and the present value of quasi-wages for women's spousal labor (w^*) declines, married women (who could possibly divorce in the future) will be more likely to enter the labor force. This follows from a view of spousal labor and regular labor as alternative ways of financial support.⁴ Accordingly, Peters (1986) found that in states where no-fault divorce laws had

been passed, women were more likely to work than in states which had not passed such laws. In a study comparing states at two points in time, Gray (1993) found that unilateral divorce laws associated with no-fault divorce encouraged labor force participation of married women only in states with community property, such as California. By reducing the expected benefits women could derive from a career in home making, no-fault divorce laws thus encouraged women to engage more in alternative careers in the labor market.

Effect on financial well-being during marriage

Another possible consequence of no-fault divorce laws is that:

No-fault divorce laws are expected to raise the compensation women receive for their spousal labor while married.

No-fault divorce laws have taken away part of the financial benefits women get in the case of divorce. These financial benefits are part of the package of benefits attracting women to marriage under circumstances where they supply more spousal labor than their husbands. It is possible that the passage of no-fault divorce laws results in compensating benefits during marriage so that the overall lifetime compensation from spousal labor to women remains constant. In other forms of employment, if employers are mandated to offer their workers fewer benefits, such as insurance benefits, it is expected that competition for workers will lead employers to compensate their workers by paying them more in cash. Likewise, one expects compensating differentials in marriage. The more such compensating differentials neutralize the effect of no-fault divorce laws on the total expected quasi-wages from spousal labor, the less no-fault divorce laws will have an impact on marriage rates and labor force participation rates of married women.

It is in this light that one may possibly explain Gray's (1993) finding that the introduction of unilateral divorce in community-property states did encourage married women's labor force participation, in contrast to the discouraging effect he found in common-law states. It is possible that in common-law states there have been more compensating differentials, i.e., competition for women's spousal labor has led men to raise the compensation women receive for their spousal labor while married more than has been the case in unity property states. Such higher compensations in marriage would thus discourage some participation of married women in the labor force.⁵

Theories of marriage by Becker and others offer many other useful insights into marriage and divorce, which can not all be covered In this

chapter. The next section relates to the contribution of Becker's theory of marriage to our understanding of consumption, fertility, and labor supply. In particular, I discuss how a determinant of marriage market conditions - the relative number of men and women - affects consumption and labor supply.

Applications to consumption and work

It was shown above that the relative financial well being of men and women while married and after divorce can be analyzed with economic theories of marriage. Financial well being is clearly related to consumption and work. The better off an individual is financially, the more he or she is expected to consume and the less he or she is expected to work. No-fault divorce laws are not the only reason we can expect variations in men and women's relative financial well being in marriage or after marriage. Any factor influencing marriage market conditions is likely to have an impact on the consumption and work of men and women.

This section uses Becker's theory of marriage - the original version and the G-version - to analyze sex ratio effects on consumption and work, income effects on consumption, and other marriage market effects on labor supply.

Marriage markets and consumption

Becker's theory of marriage contains many important implications for the study of consumption and fertility. Becker first presented some of these insights in 1973 in the first article he published on the economic analysis of marriage. The same insights also appeared in his *Treatise on the Family* in 1981 in a chapter on polygamy. The limited interest most people have for studying polygamy and the limited degree to which Becker elaborated on these ideas help explain the lack of recognition these ideas have received in the economics profession.

In the section on division of output between mates, Becker (1973) showed how the relative well-being of wives and husbands within marriage depends on factors influencing marriage markets. He mentions possible measurable indicators of such relative well being, such as consumption expenditures benefiting husbands and wives, and leisure time enjoyed by husbands and wives.

In Becker's theory of marriage, individuals compare their output as single to their output as part of a marriage, output including a wide range of activities, goods, and services. Assume women and men can obtain a certain output if they are single (respectively Z_w and Z_m). If they marry, their combined output (Z_m) is expected to exceed the sum of the outputs they

can produce if they stay single. This follows from the assumption of rationality, which implies that people do what is better for them. This does not specify how their new joint output is divided amongst them.

Becker's analysis implies that there is a minimum amount each spouse needs to get after marriage: the output they would get while single, so that each individual who marries is at least as well off married as he or she would be if single. In other words, the *opportunity cost* of marriage to an individual is the value of the foregone alternative, namely his or her output while single. Becker showed that under the simplifying assumption that all men are identical and all women are identical, the division of marital output between husband and wife depends on the sex ratio, wage rates, and other factors influencing marriage market conditions.

To follow this argument, consider figure 6.2. The supply of women in the marriage market is their opportunity cost of getting married (Z_w). Each woman in the marriage market adds a point to that supply. If there are N_w women, the supply is horizontal until there are no more women available, at which point it becomes vertical. The demand for women in the marriage market is the maximum amount men are willing to pay in order to marry. Since they too will not agree to receive a share of marital output that is smaller than their output while single, that implies that the maximum amount of joint output husbands are willing to let their wives consume is the difference between marital output and men's output if they remain single ($Z_m - Z_w$). The demand is horizontal until there are no more men available. Assuming that monogamy is imposed and that there are N_m men, the demand becomes vertical when men have entered the marriage market.

This theory of marriage, as well as the G-version presented earlier, can help explain how many different factors influence consumption. It has been shown that divorce laws affect the relative well being of men and women in marriage. Likewise, marriage market conditions will be affected by tax laws and marriage laws. Next, I examine how another determinant of marriage market conditions, the sex ratio, affects consumption in marriage.

Sex ratio effects

The relative share husbands and wives receive out of the marital output depends on their output if single, their combined output if married, and the number of men and women. In terms of figure 6.2, women get a relative output (or income from marriage) which has their output as single as a lower bound (the supply until point N_w) and the maximum portion of marital output men will agree to share with a wife (the demand until point N_m) as an upper bound. If the number of men is less than the number of women ($N_m < N_w$), as depicted in panel (a) of figure 6.2, all men marry and some women remain single. The relatively scarce men are in a good market

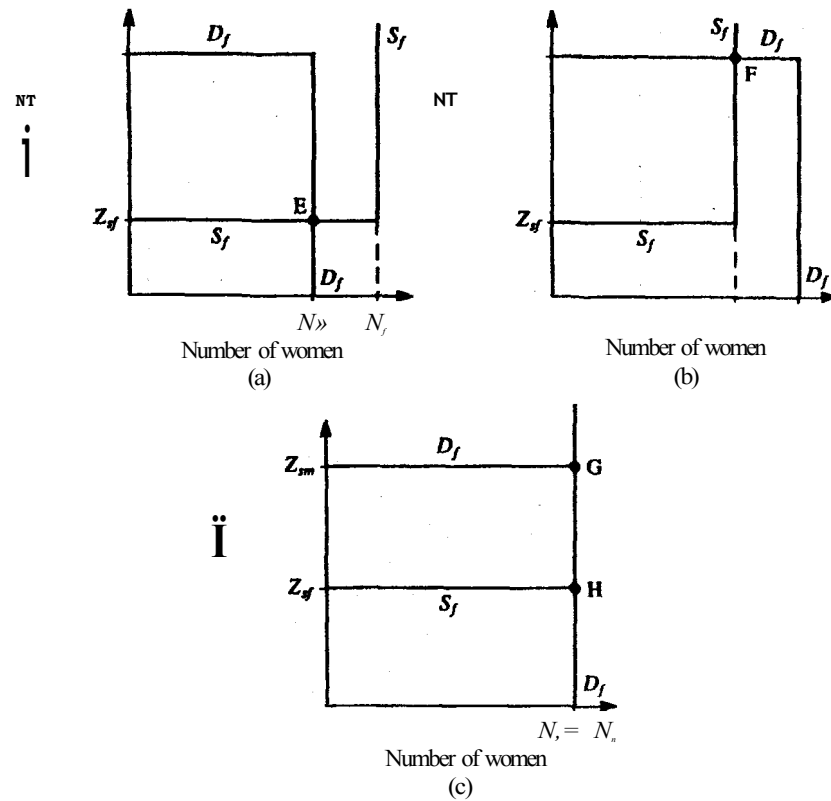


Figure 6.2 Equilibrium in a monogamous marriage market assuming (a) more women than men, (b) more men than women, and (c) equal number of men and women

Source: Becker (1981), figure 3.1.

position and able to reap the entire gain from marriage. Women's share of the marital output will be equal to what they would have if they stayed single, i.e., women are equally well off whether they marry or not. Men get the difference between marital output and women's single output.

The situation is completely different when the number of women is less than the number of men ($N < N_w$), as depicted in panel (b). In this case, women are relatively scarce and able to reap the entire gain from marriage. Men have the same income, whether they marry or not, implying that they are equally well off whether they marry or not. Women's income from marriage consists of the combined marital output from which men's single output has been deducted.

A comparison of these two simple cases thus indicates that the gender

who is scarce in the marriage market gets more out of marriage. Under these assumptions, if there are more men than women, women gain from marriage but men do not. If there are more women than men, men gain from marriage but women do not. If there are equal amounts of men and women, as depicted in panel (c), the division of output can not be determined by demand and supply.

Using the traditional demographic definition of sex ratio as number of men divided by number of women, it follows from this simple model that:

When the sex ratio is high, women benefit from marriage. When the sex ratio is low, men benefit from marriage.

This suggests that as the sex ratio increases, so will women's share of marital consumption and leisure. The relationship between sex ratio and relative well-being in marriage may not be a smooth mathematical function. Big changes may occur when the balance of the sexes moves from a surplus of men to a surplus of women, or vice-versa.

The insights mentioned above regarding men and women's relative consumption in marriage also follow from the G-version of Becker's theory of marriage presented in the section on no-fault divorce. According to the G-version, marriage functions in part as an institution regulating the supply of spousal labor, where spousal labor is defined as work benefiting a spouse.

Earnings from spousal labor, determined in part in markets for spousal labor, are one possible source of individual income and affect individual consumption by husband and wife. Everything else constant, the more people earn in marriage, the more they can consume what they like (including psychic benefits obtained from working in enjoyable spousal labor). We are now ready to tie relative consumption by husband and wife to sex ratios.

The more men relative to women in a given marriage market - i.e., the higher the sex ratio - the larger the aggregate demand for spousal labor in comparison to the supply, and therefore the higher the market-determined compensation for spousal labor women can obtain if they marry. In terms of figure 6.1, a higher sex ratio (keeping the total population size constant) implies a larger demand by men for women's spousal labor and a smaller supply of spousal labor by women. In turn, this raises the equilibrium quasi-wage for women's spousal labor w^* .

The more women earn from spousal labor, the more it is likely that women consume what they like, and the less it is likely that men consume what they like (mostly because husbands have to pay higher compensations for their wives' spousal labor). We thus get a hypothesis similar to the one derived above from Becker's original theory of marriage:

The higher the sex ratio, the more married women consume in marriage relative to married men.

Male and female income effects

Becker's theory of marriage can also explain why the effect of wages and income depends on whether that income is received by husbands or wives. Consider the consumption effects of income individuals receive regardless of marital status or work status. The effect of income received by women is expected to differ from the effect of income received by men. For instance, if women's income increases regardless of marital status, that implies that their opportunity cost of marriage is higher, and therefore their share of marital output is also likely to be higher. In addition, women's higher income may also translate into a higher marital output, which may also translate into higher consumption levels for women in marriage. If men's income increases, their income is higher regardless of marital status. What that implies for their wives is not so obvious: marital output is likely to increase, which may benefit women's consumption, but the maximum amount of marital output men will agree to let women consume will decrease as men's income increases.

The G-version of Becker's theory of marriage can also explain why the effects of men's unearned income on consumption will differ from the effects of women's unearned income. Given that individual husbands and wives are not conceptualized as merging totally into one unit of production - instead, they are viewed as working for each other - it is obvious that the more income an individual has, the more she (or he) will consume what she likes. Further effects via markets for spousal labor⁶ are unlikely to cancel the basic effect of increased individual consumption following from increases in individual income. In sum, it follows from these market theories of marriage that:

Male consumption in marriage is more likely to be affected by male income, whereas female consumption in marriage is more likely to be affected by female income.

A possible application is to study differences in the impact of income on children's well-being, depending on whether the income gets into the mother's or the father's hands. If it is assumed that mothers care more about their children's health and nutrition than fathers do, then the larger the portion of marital output consumed by the wife, the more resources are likely to be spent on children. Under this assumption, it follows from Becker's theory of marriage that if a government transfers funds earmarked for children to mothers (regardless of marital status) this will increase mothers' relative well-being in marriage which will benefit children more than if income is transferred to fathers, the latter causing an increase in fathers' relative well-being in marriage.¹

Furthermore, one can apply this theory of marriage to the study of fertility. If it is assumed that men and women have different preferences regarding fertility, then the larger the wife's share of marital output, the closer the actual number of children will be to the number of children desired by the wife.

A final application of Becker's theory of marriage, which is the focus of the rest of this chapter, is the effect of marriage markets on labor supply. The main contribution of my own version of Becker's theory of marriage is that it ties the analysis of marriage and divorce with the analysis of labor supply.

Marriage markets and labor supply

According to the G-version of Becker's theory of marriage presented at the beginning of this chapter, people are viewed as producers of home-made goods and services who employ each other's spousal labor and supply spousal labor to each other. Markets for spousal labor, such as the one depicted in figure 6.1, influence the value of time of people engaging in spousal labor.

Economists analyze labor-supply decisions as based on a comparison of the attractiveness of work, measured by the wage, and the attractiveness of staying at home, which is typically denoted by w^* (the value of time).^{*} The innovative insight derived from this analysis of marriage markets is that part of the value of time in the home is established in a market for marriage. In contrast, according to traditional labor-supply theory w^* is entirely established in the household and does not vary with marriage market conditions.

According to traditional labor-supply theory, the value of time in the home always depends on the individual's work status. If the individual works, the value of time w^* is equal to the wage, and if she does not work, w^* exceeds the wage. According to this marriage market-based model, for both working and non-working married individuals, value of time is equal to w^* based on a marriage market component. The *quasi-wage for spousal labor* is established in a market for spousal labor. Such quasi-wages may vary for different people, depending on who marries who in a particular society.

The higher the value of time - based in part on marriage market conditions - the less a person is likely to participate in the labor force. The introduction of a component of w^* established in a market for spousal labor (or marriage market) leads to a number of theoretical implications. Most importantly, it leads to the introduction of new variables into the analysis of labor supply, such as sex ratios and group differences in marriage opportunities. It also leads to new interpretations of income and

wage effects, and of the backward-bending supply of labor. An insight which follows from the economic analysis of marriage markets which has not received much attention in the past is the idea that the number of men and women in a society affects women's labor supply due to its effect on marriage market conditions.

Sex ratios and female labor-force participation.

As was shown earlier the relative number of men and women - which can be defined as the sex ratio - influences conditions in marriage markets. In terms of the G-version which analyzes marriage as a mutual employment relation, the market-determined value of time w^* varies with demand and supply in the market for spousal labor (see figure 6.1). Comparing people in two different marriage markets with varying sex ratios, the higher the sex ratio-i.e., the larger the relative number of men in a marriage market - the higher the demand for women's spousal labor compared to the supply of spousal labor. Consequently, the marriage market component of the value of time of married women will be higher the higher the sex ratio. This implies lower participation rates of married women in the labor force than if the value of time is lower due to lower sex ratios. At the same time, variations in the number of men and women are also likely to affect labor markets (in the common sense of labor). If sex ratios are high and women are relatively scarce, this may cause increases in women's wages.

Under reasonable assumptions an increase in the relative number of men - which is associated with a higher sex ratio - is predicted to cause an increase in demand for women's spousal labor, which leads to an increase in women's value of time w^* , and therefore a decrease in total female employment. Higher sex ratios may also cause higher wages, which may increase female employment. It can be assumed that sex ratios have more of an impact on women's value of time (due to their impact on marriage market conditions) than on women's wages.⁹ It is thus hypothesized that:

Sex ratios are inversely related to women's labor supply in general, and married women's labor supply in particular.

Evidence for this hypothesis can be found in comparisons across different cities in the United States at any given time, or based on changes over time. In a study of cities in the United States in 1930 and 1980, it was found that the higher the sex ratio, the lower the rate of participation of married women in the labor force (see Grossbard-Shechtman 1993).

Sex ratios vary over time due to the tendency of men's age at marriage to exceed women's age at marriage. Consequently, women born during periods of population growth tend to experience bad marriage market

conditions when they grow up, whereas men born during periods of population growth tend to experience favorable marriage market conditions. The opposite is true for men and women born during periods of declining fertility, such as the baby-busters now entering marriage and labor markets.

It follows that women born during periods of growing population (baby-booms) are likely to experience low quasi-wages for spousal labor (w^*) and therefore higher rates of labor force participation when married. Everything else constant, one expects higher quasi-wages for women born during periods of declining population (baby-bust) and therefore lower rates of labor force participation. The evidence shows that the most rapid increases in the labor force participation of married women in the United States occurred among women born at the beginning of the baby-boom or slightly earlier, women who must have experienced unfavorable marriage market conditions according to an analysis of demand and supply of spousal labor. Baby-bust cohorts who have recently entered the labor force are experiencing much slower rates of growth in labor force participation (see Grossbard-Shechtman and Granger 1994). This is especially true for married women.

Other factors affecting marriage markets

It also follows from an economic analysis of marriage markets that individual or group differences in marriage opportunities are related to the value of time in the home, and therefore labor supply. Factors influencing an individual's value of time w^* include characteristics of both men and women which are considered as important in marriage markets. It follows that:

The higher a woman's value in the marriage market, the higher her value of time and the lower her labor supply.

Value in the marriage market is not always easy to establish. It probably varies with education, income of family of origin, ethnic origin, and number of previous marriages.

It is generally estimated that African-American women experience worse marriage market conditions in the United States than American women of European descent. This could help explain why the participation rate of married women of African origin has traditionally exceeded that of married women of European origin in this country, even after controlling for all variables usually included in labor-supply estimations.

Furthermore, the pecuniary component of a particular woman's value of time depends not only on her own characteristics, but also on her husband's characteristics. Compensating differentials may exist, whereby husbands who offer relatively low non-pecuniary benefits to their wife make up for

such shortcomings by providing their wife with more generous pecuniary benefits than do husbands offering relatively high non-pecuniary benefits. In other words, husbands can make up for an undesirable trait, such as old age or poor health, by sharing a higher proportion of their wealth with their wife. It follows that:

Compensating differentials leading to pecuniary compensations by husbands to wives have a discouraging effect on wives' labor supply.

This could explain why women married to men substantially older than themselves were less likely to participate in the labor force than women married to men who were the same age or slightly older. More hypotheses relating marriage market factors to labor supply include factors associated with a higher probability of divorce and divorce laws. These and other hypotheses are discussed at more length in Grossbard-Shechtman (1993).

A comparison with other theories

The rest of this chapter is devoted to comparing Becker's theory of marriage (which includes his original version and the G-version) with two alternative theories: (1) pooled household models and (2) game-theoretic models.

Becker's theory of marriage versus pooled household models

In these models, the decision maker is conceived of as a household consisting usually of at least two people, usually a husband and a wife. Such models assume either collective decision making or altruistic concerns on the part of a principal decision maker. Widely used in studies of consumption, labor supply, or fertility, pooled household models have often been labeled neoclassical. In fact, these models also owe a large intellectual debt to Becker.

In comparison to pooled household models, models based on Becker's theory of marriage have the following advantages:

- 1 Becker's theory of marriage provides explanations for various aspects of marriage and divorce. Pooled household models assume a household as given and do not deal with the formation and dissolution of households.
- 2 In Becker's theory of marriage individual members of a household maintain some degree of independent decision making (more so in the G-version than in the original version). Consequently, according to this theory of marriage income and wealth effects on consumption and work will depend on whether it is the wife's or the husband's income or wealth. In contrast, in pooled household models all resources belonging to the

household members are pooled, and the source of income or wealth does not matter.

- 3 Factors influencing marriage markets are expected to affect a variety of outcomes (e.g., consumption and labor supply) according to the theory of marriage based on Becker but not according to pooled household models. Such marriage market variables include sex ratios, divorce laws, and tax laws dependent on marital status (see above).
- 4 Factors influencing the demand and supply of spousal labor are expected to affect a variety of outcomes (e.g., consumption and labor supply) according to the theory of marriage based on Becker but not according to pooled household models. For instance, when substitutes for spousal labor become more expensive (e.g., due to an increase in the wages of live-in maids or a restriction on the employment of illegal aliens working as live-in maids), this is predicted to increase the demand for spousal labor, and therefore likely to affect all the outcomes discussed above.
- 5 In comparison to pooled household models, marriage models based on Becker's theory of marriage possibly lead to improved methods of estimating outcomes such as divorce and labor supply.

Becker's theory of marriage versus game-theoretic models

To the extent that game theory is an alternative to neoclassical economic analysis, game theories of marriage are an alternative to Becker's neoclassical theory of marriage. Game theory has been applied to the study of marriage at least since Shapley (1962). According to a version of this theory found in McElroy (1990) each household member has a utility function and a threat point, which is the person's maximal level of utility outside the household. Such individual threat points are influenced by prices, incomes, sex ratios, and laws, the same factors which Becker and Grossbard-Shechtman considered when analyzing marriage markets. Outcomes, such as one spouse's consumption or labor supply, vary with all the factors which influence these threat points. Consequently, the individual supplies of labor or demands for goods found in McElroy (1990) are very similar to the supplies of labor and demands for goods found in Grossbard-Shechtman (1984, 1993).

Game-theoretic models do not incorporate marriage market conditions as directly as the marriage market models do. Therefore, it is not straightforward how game-theoretic models of decision making tie into the existing literature on labor supply. In contrast, marriage market models - at least the G-version - tie very easily into traditional models of labor supply.

In sum, many but not all the advantages of Becker's theory of marriage that were mentioned in a comparison between that theory of marriage and

pooled household models are shared by game-theory models of marriage. In fact, proponents of game-theory models of marriage have criticized the pooled household models on most of the same grounds that were mentioned above. What has obscured the discussion, however, is that proponents of game-theory models have addressed their criticisms not specifically to neoclassical pooled household models, but to neoclassical models in general. They have overlooked the fact that models based on Becker's neoclassical theory of marriage are substitutes for Nash-bargained models of household behavior. Both kinds of models have considerable advantages over neoclassical pooled models.

Conclusions

This chapter has summarized some of the important insights that can be derived from Becker's theory of marriage. Some of these insights were mentioned by Becker himself, while others can be found in my own model based on Becker's theory of marriage. The insights from Becker's theory of marriage which apply to consumption and labor supply were emphasized, in an attempt to make up for the lack of attention most economists have paid to these implications.

One can only speculate as to the reasons why empirical studies distinguishing between the effects of male and female income on consumption and fertility have preferred to justify such distinctions based on a Nash-bargained household model rather than on Becker's theory of marriage. It certainly is not a function of the chronological order or the complexity of these theories, as Becker's theory of marriage first appeared before game-theoretic models of household behavior became popular. Also, Becker's theory of marriage is simpler to understand than the game-theoretic models, as it links easily to the neoclassical models which dominate other fields of economics.

To the extent that the unfair treatment received by Becker's theory of marriage has resulted from the brevity of Becker's own treatment of the implications of his theory for consumption, fertility, and labor supply, it is hoped that this essay will help correct the situation. Justice was served when Becker received a Nobel prize that was long overdue. Justice will be served even better when due recognition is given to valuable aspects of Becker's contribution which have been ignored by most of the economics profession.

Notes

- 1 The hclplul comments or Gary Becker. Andrea Beller, Jeffrey Gray, Mariano Tommasi, and anonymous referees are gratefully acknowledged.
- 2 For a more detailed comparison between the economics of marriage and studies of marriage in other disciplines see Grossbard-Shechtman, 1993 (chapter 1). Interested readers wanting to delve more deeply into the economic analysis of marriage are encouraged to start with Becker (1981) and Grossbard-Shechtman (1993).
- 3 A helpful survey of such studies can be found in Parkman (1992).
- 4 Peters (1986) derived the same hypothesis.
- 5 Alternatively, it is possible that no-fault divorce has lowered the present value or women's value of time in marriage (based on the flow of future earnings from marriage) in states with community-property statutes more than in states with common-law statutes.
- 6 For instance, the larger women's income from sources other than spousal labor, the more women's supply of spousal labor shifts to the left, which is likely to be associated with a reduction in the amount of spousal labor and an increase in the compensation for spousal labor. Depending on other assumptions, this could cause women's income from spousal labor to either decrease or increase.
- 7 It was found in both the Philippines and in Brazil that income in mothers' hands benefits children more than income in fathers' hands (Senauer, Garcia, and Jacinto, 1988; Thomas, 1990). Furthermore, also consistent with Becker's theory of marriage, in Brazil it was found that mothers preferred to devote resources to improve the nutritional status of their daughters, whereas fathers preferred to devote resources to improve the nutritional status of their sons (Thomas, 1990).
- 8 This section is based on chapters 3, 5, and 6 in Grossbard-Shechtman (1993).
- 9 Sex ratios are likely to have little impact on women's wages if male and female workers are easily substituted for each other, and if the demand for female workers is not very elastic.

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