An Economic Analysis of Marital Instability

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This paper focuses on the causes of marital instability. Section I develops a theoretical analysis of marital dissolution, incorporating uncertainty about outcomes of marital decisions into a framework of utility maximization and the marriage market. Section II explores implications of the theoretical analysis with cross-sectional data, primarily the 1967 Survey of Economic Opportunity and the Terman sample. The relevance of both the theoretical and empirical analyses in explaining the recent acceleration in divorce rates is also discussed.

At the beginning of this century, separation and divorce were unimportant sources of marital dissolution[1] compared to death from childbirth, contagious diseases, and other causes. Couples marrying could expect to remain together until death. The substantial decline in death rates during this century, combined with a steady growth in separations and divorces that sharply accelerated during the last 10 years, has radically altered these expectations. Today, a typical couple has only a small probability of being separated by death during their first 15 years of

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[1] Throughout this study we use the terms "divorce" and "dissolution" interchangeably, and we do not distinguish in the theoretical section among separation, annulment, and divorce.

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marriage, but perhaps 10 times as high a probability of being separated by divorce.

This dramatic change in the incidence of voluntary dissolutions has major implications for many kinds of family behavior. Couples are reluctant to invest in skills or commodities "specific" to their marriage if they anticipate dissolution: having children and working exclusively in the nonmarket sector are two such marriage-related activities. That is, the rise in women's labor force participation rates and the fall in fertility rates in the past 2 decades have partly been caused by, as well as being causes of, the rise in marital instability.

Although many effects of marital dissolution are discussed, this paper focuses on the causes of dissolution. Why are divorces more common among the poor, blacks, geniuses, and the retarded, or among couples marrying young, or couples in racially or religiously mixed marriages? Do the causes of cross-sectional differences in divorce also explain the growth in the divorce rate over time, including its recent acceleration?

We believe that these causes can be discovered by extending the analysis of marriage developed by Becker (1974). He assumes that persons marry when the utility expected from marriage exceeds the utility expected from remaining single. It is natural to assume further that couples separate when the utility expected from remaining married falls below the utility expected from divorcing and possibly remarrying. One way to reconcile the relatively high utility expected from marriage at the time of marriage and the relatively low utility expected at the time of dissolution is to introduce uncertainty and deviations between expected and realized utilities. That is, persons separating presumably had less favorable outcomes from their marriage than they expected when marrying.

Section I develops a theoretical analysis of marital dissolution that incorporates uncertainty about outcomes of marital decisions into the framework of utility maximization and the marriage market. This analysis has implications about the effects of income, age at marriage, fecundity impairments, number of children, duration of marriage, welfare payments, and many other variables on the likelihood of marital dissolution. Section II tests these implications with cross-sectional data, primarily the 1967 Survey of Economic Opportunity and the Terman sample of geniuses. Evidence from many other studies and from time series is also discussed. For the most part, the evidence confirms the theoretical predictions.

The analysis presented here is also applicable to other contracts of indefinite duration, where the parties involved have the option of termination, perhaps with a penalty. Examples include explicit contracts between business partners and implicit "contracts" binding together employees and employers, customers and suppliers, or friends. The relation, for example, of employee turnover to duration of employment, specific investments, marital status, and other variables is illuminated by the analysis in this paper.

I. Theoretical Analysis

1. *Basic Framework*

Households are assumed to use nonmarket time and market goods to produce nonmarketable commodities. Each person maximizes the utility from the commodities that he or she expects to consume over his lifetime. With risk-neutrality, this criterion simplifies to the maximization of expected full wealth—the present value of the stream of commodities consumed. Full wealth does not equal money wealth alone but also takes account of the productivity of nonmarket time.

By assumption, each marital "strategy" produces a known amount of full wealth, and the opportunity set equals the set of full wealths produced by all conceivable marital strategies. The individual ranks all strategies by their full wealth and chooses the highest. Even with certainty, a strategy with marriage, then dissolution, and eventually remarriage might be preferred to all other strategies and would be anticipated at the time of first marriage. Dissolution would be a response perhaps to the growing up of children, or to diminishing utility from living with the same person, and would be a fully anticipated part of the variation in marital status over the life cycle.

It is commonplace that uncertainty pervades all decisions, and perhaps nowhere has this been more fully appreciated than in discussions about marriage.[2] Even after prolonged dating, newly married persons face tremendous uncertainty about their own or their mate's needs, their capacity to get along with each other, their fecundity and other aspects of having and raising children, and so on almost indefinitely. Uncertainty introduces a whole new dimension into the analysis because dissolution no longer need be fully anticipated but can result from unexpected events.

The optimal marital decision at any moment would be the one that maximized the expected value of full wealth over the remainder of life, given the realizations up to that moment. The optimal strategy would be the set of all these optimal decisions and would in general include divorce at different stages in the life cycle, sometimes contingent on the realization of unfavorable outcomes, and sometimes consistent with the realization of expected outcomes. With divorce viewed in a stochastic framework, it is natural to consider the probability of divorce as a function of two factors: the expected gain from marriage and the distribution of a variable describing unexpected outcomes. The probability of divorce is smaller the greater the expected gain from marriage, and the smaller the variance of the distribution of unanticipated gains from marriage.

[2] "Marriage is the only adventure open to the timid" (Voltaire); "marriage be a lottery in which there are a wondrous many blanks . . ." (Vanburgh); "marry in haste, and repent at leisure" (Cabell). (These references are taken from Evans [1968].)

We suggest that the majority of divorces results from uncertainty and unfavorable outcomes and, therefore, would not occur in a world where outcomes could be anticipated. Indirect evidence supporting this view is that most dissolutions occur early in marriage, not after many years when children have grown or couples have tired of each other. In fact, the median duration to divorce has been about 7 years, and three-quarters of all divorces take place before the fifteenth anniversary of marriage.[3] Since there are sizable emotional and financial costs of divorcing, people would presumably prefer to remain single rather than enter a marriage that is expected to dissolve within a few years.

Up to this point we have discussed one spouse's decision about divorce as if the other spouse had no say in the matter. If the two spouses concur in judging their own expected full wealth to be greater either by remaining married or by divorcing, there would be no disagreement about whether or not to divorce. But what if these judgments differ? If all compensations between spouses were feasible and costless, a couple would separate if, and only if, their combined wealth from remaining married were expected to be less than their combined wealth when separated. For if one spouse expected greater separated wealth while their expected married-wealth was greater than their combined expected separated-wealth, the other spouse would be able to compensate the first to remain married. Likewise, if one spouse expected less separated wealth while their combined separated-wealth was greater than their married-wealth, he or she could be compensated to separate (if consent were required) because the one spouse's gain would exceed the other's loss. Indeed, compensation of a spouse to induce acquiescence is an excellent illustration of the "Coase Theorem" that the allocation of property rights or legal liability does not influence resource allocation when the parties involved can bargain with each other at little cost.

The conclusion that a couple dissolves their marriage if, and only if, their combined wealth when dissolved exceeds their combined married-wealth is a direct extension of the conclusion (see Becker 1974) that single persons marry if, and only if, their combined married-wealth exceeds their combined single-wealth. Both conclusions assume that the division of wealth between mates is flexible, which contrasts sharply with the assumption implicit in many discussions, namely, that the division of married-wealth is rigidly determined by custom, "family" goods, and the like. Asset transfers and alimony payments after dissolution introduce more flexibility into the division than may appear from the importance of "family" goods, in the same way that asset transfers prior to marriage—

[3] During the 1950s and 1960s the median duration of marriage prior to divorce ranged between 5.8 and 7.5 years in the United States (Plateris 1973*b*, p. 39; and Plateris 1973*a*, p. 49).

such as dowries and bride prices—introduce more flexibility into marital divisions.

If the division of wealth between spouses is sufficiently flexible, it would not be meaningful to say that one mate "walked out" on or was "abandoned" by the other. This is obviously not a useful distinction when each gains from divorce, but it is also true, if less obviously, when divorce is available at the option of either mate. Suppose that one mate gained 100 units and his spouse lost 60 units of real income from a divorce, relative to their *predivorce division of outputs*. Relative to that division, when divorce occurs one might say she was "abandoned" and he "walked out." He would be willing to stay, however, if the division within marriage were changed in his favor by at least 100 units, but with that division she would "walk out" and he would be "abandoned" because she would gain more than 40 units from a divorce, and he would lose. Whether one mate "walks out" or is "abandoned" is ambiguous, therefore, and depends critically on the marital division that is used as a yardstick.

The same argument applies to the distinction between "quits" and "layoffs" in discussions of the turnover of employees. If the combined wealth of a firm and employee were decreased by a separation, there would exist a transfer (i.e., a wage payment) from the firm to the employee (or vice versa) that would induce them to stay together. Of course, even if their combined wealth were increased by separation, the firm would want to keep him and he would want to leave *at some wage*. However, at a sufficiently higher wage, the firm would want him to leave and he would want to stay. Although wage "rigidity" may prevent fluid divisions between firms and employees, the rigidity in labor (as well as marriage) markets has been greatly exaggerated, and combined maximization is probably also the appropriate model in labor markets.[4]

2. *Dissolution and Expected Gain from Marriage*

The probability of divorce is greater the smaller the expected gain from marriage, provided unexpected gains are not strongly negatively correlated with the expected gain. Becker (1974) provides an extensive analysis of optimal marital sorting that explains the predominance of positive

[4] Instead of basing the distinction between quits and layoffs on rigidity in the wage or marital division, a more promising approach relies on the *cause* of a job or marital separation. A quit could be said to result from an improvement in opportunities elsewhere and a layoff from a (usually unexpected) worsening in opportunities in this job or marriage. This way of distinguishing quits from layoffs has many implications, among them that persons quitting have shorter spells of unemployment (or duration of time to remarriage) than persons laid off and improve their circumstances more in their new jobs (or marriages). These implications have received some empirical support (see Kuratani 1973; Bartel 1975; Hashimoto 1975; Martin 1977). We conjecture that most marital separations, as most job layoffs (see Feldstein 1976), are temporary; i.e., separated mates are more likely to return to each other than to divorce.

assortative mating with respect to personal characteristics such as education, height, intelligence, age, property income, physical attractiveness, etc. The explanation applies to all traits which are not good substitutes in the production of commodity income, while negative assortative mating would be optimal for substitutes, such as wage earning power. Becker further shows that, where positive assortative mating is optimal, persons with higher-valued characteristics gain more from marriage (compared to being single). So couples with, say, more property income or education would be expected to have greater gains from marriage and consequently lower probabilities of divorce.

Becker's analysis of optimal sorting assumes that the traits and productive capacities of persons are fixed. However, they are affected by the marital sorting itself. For example, a person will tend to specialize in acquiring skills that raise market productivity compared to nonmarket productivity if he spends more time in the market sector after marriage as a result of substitution of spouse's time in the nonmarket sector. Conversely, he will specialize more in acquiring nonmarket skills if he spends more time in the nonmarket sector after marriage.

Therefore, the gain from marriage compared to being single depends in part on the extent to which investments in skills are oriented to the division of labor within marriage. The effect of specialized investments on the incentive to become and to stay married can explain why women have traditionally married earlier: their investments have been more closely geared to child rearing, household management, and other domestic activities that are much less useful to single persons.[5] As another example, consider men with relatively high earnings potential. In the optimal sorting, they marry women with relatively low earnings potential, greater physical attractiveness, and superior other nonmarket characteristics. Therefore, men with relatively high earnings potential gain more from marriage than men with relatively low earnings potential not only because of the higher level of their income but also because of greater gains from specialization within marriage, since their mates have a comparative advantage in specializing in nonmarket investments.

As a final example, consider the relation between level of schooling and the gain from marriage. For persons with relatively high levels of schooling, the effect of specialized investments on the gain from marriage at least partly offsets the effect of optimal sorting. On the one hand, marriages between highly educated individuals have greater gains because of the spouses' high levels of market and nonmarket skills. On the other hand, they have lower gains because they typically involve less

[5] Accordingly, it is not surprising that the sex differential in age at first marriage has greatly declined during the last 20 years (see Plateris 1973*b*, p. 55); the investments of women have become much less specialized to married life as they have reduced their childbearing and increasingly entered the labor force.

specialization between spouses, since more educated women participate more in the labor force. Consequently, there is no clear theoretical prediction about the net effect of schooling level on the gain from marriage.

3. *Dissolution and Search*

In this section we discuss the sorting of persons and the stability of marriages when there is limited information about the traits of potential mates, and when remarriage is not possible (remarriage is introduced in Section I.5). It is often difficult—that is, expensive—in actual marriage markets to find a satisfactory mate. For example, persons with rare traits, such as an IQ over 150, $1 million, a height in excess of 6 feet 6 inches, or being a Moslem in South Dakota, usually have to spend considerable resources "searching" for mates with similar traits because most persons encountered have more typical traits. Anticipating these difficulties, persons with rare traits may compromise and settle for mates with less similar traits; that is, they may give up the gains from an "optimal" mate in order to reduce their expenditures of time and money on search. The costs of finding a satisfactory mate are important in understanding marital dissolutions because they can affect the expected gain from marriage.

Imperfect information that results from the cost of finding a mate cannot increase the gain from marriage above the "optimal" (i.e., the gain with perfect information) for any couple and will reduce the gain for most couples. Since the total gain from marriage over all marriages is maximized in the "optimal" sorting, persons not matched in this sorting could not increase their gain by marrying each other. Consequently, most couples will gain less in all other sortings, and some couples may gain the same amount. The actual and "optimal" sortings differ because the cost of finding a mate induces at least some couples to accept a lower gain from marriage than they would receive in the "optimal" sorting. The larger the marital search costs, the smaller the acceptable gain, and the larger the deviations from the "optimal" sorting. Although all *couples* gain less (or at least do not gain more) than in the "optimal" sorting, some *persons* with relatively low search costs may gain more because they can capitalize on the greater search costs of others to make advantageous marriages.

The process of searching for a mate can be formalized along the lines developed in the extensive recent literature on search.[6] Each person spends resources selecting a drawing from a frequency distribution of potential mates; each drawing gives the wealth that can be expected from

[6] Search theory was first applied to the marriage market by Keeley (1974).

that match. This frequency distribution is determined by the search costs of all persons in the marriage market. If search costs were zero for everyone, this distribution would reduce to a single point—the person's wealth in the optimal sorting.

After each drawing the individual must decide whether to accept that match or to continue searching for a better one. The cost of continuing to search for a better match is the sum of search costs and any income forgone by remaining single rather than marrying an available match. The expected benefit from continuing to search equals the product of the probability of finding a preferable mate times the expected increase in wealth from finding a preferable mate ($\bar{W}_{mf} - W^a_m$), where $\bar{W}_{mf}$ is the expected wealth from a better match and W^a_m is the expected wealth in the best available marital status (i.e., single or married to the best available potential spouse). The individual is indifferent to accepting the available offer when the cost and expected benefit from additional search are equal. Actual marital offers differ even among persons with the same search costs and the same frequency distribution of offers since some will be "lucky" and some will be "unlucky." The latter will have, after the marital search process ends, lower expected gains from marriage and thus higher probabilities of divorce.

The search process can also be usefully described in terms of the set of acceptable traits. If search costs, wealth, and number of persons varied continuously as a function of traits, the acceptable traits would form a closed continuous set around the "optimal" trait (i.e., the trait of one's mate in a world with perfect information) (see Wessels 1976). The upper and lower bounds of this set are depicted as A^u and A_l in figure 1. The expected wealth from a match with either trait A_l or trait A^u must equal the value of additional search when these matches are available, and these matches must both provide the same wealth, W^a_{mf}. The offers available from matches to persons with traits anywhere to the left of A_l or to the right of A^u must be less than the value of additional search when faced with these matches (otherwise these traits would be in the acceptable set), so continuity implies equality between the offers and the value of search at the boundaries of the acceptable set. These boundaries are determined not only by one's own search costs, but also by the costs of everyone else in the marriage market, the distribution of traits in this market, and household production functions.

Since offers must exceed the value of search in the interior of the acceptable set, interior offers must exceed the offer at the boundaries.[7] In figure 1 we assume the wealth offers rise continuously with A from the lower boundary to a peak somewhere near the "optimal" match and

[7] For a proof, see Becker, Landes, and Michael (1976), an early, lengthy version of this paper.

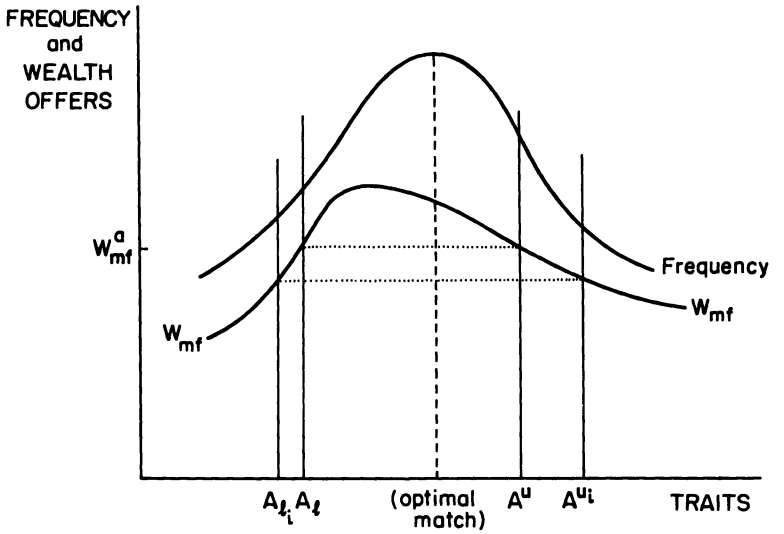

FIG. 1

then fall continuously to the upper boundary. The distribution of offers need not be symmetrical around the peak offer, so that the lower and upper boundaries will not in general be equally far from the peak.

A movement to the left along the distribution of wealth offers corresponds, although not perfectly, to a movement in either direction away from the "optimal" matching trait in figure 1. Therefore, when one accepts an offer closer to the minimum acceptable offer, he generally accepts a greater "mismatch," a greater deviation between his actual and his "optimal" matching trait. An increase in search costs alone lowers one's minimum acceptable offer and widens the boundaries of his acceptable set of traits in figure 1. Greater mismatches become acceptable because the value of additional search is reduced by the increase in search costs. Consequently, an increase in search costs can be said to increase the frequency of dissolutions because it increases the incidence of mismatches; hence, dissolutions and mismatches should be positively related empirically.[8]

In addition to "extensive" search, there is "intensive" search to improve the accuracy and reliability of expectations about a particular match. An individual spends time and other resources learning more

[8] The equilibrium acceptable sets of men and women in the marriage market are interrelated in a very simple way. If A_{l_i} is the lower bound of males with the trait A_{m_i}, then A_{m_i} is the upper bound for females with A_{l_i} (for a proof, see Becker et al. 1976). Similarly, A_{m_i} is the lower bound for females with A^{u_i}. Therefore, if all the male boundaries were known, all the female boundaries would also be known, and vice versa. Moreover, if all male boundaries increased as their trait increased, then all female boundaries would also increase as their own trait increased.

about a potential spouse through dating and other contacts because his expectations are partly determined by information he has about himself and the potential mate. In a simple model of this search process, evidence on the match accrues at a constant rate during a courtship and after marriage. Clearly, the probability of dissolution would be smaller the smaller the variance in the distribution of realized wealth; it would also be smaller the longer the duration of a marriage because only marriages with favorable realizations survive long durations.[9]

This simple model can be generalized to permit the flow of evidence to depend on direct search outlays and on whether the search was prior or subsequent to marriage. Using the arguments developed for extensive search, we can show that an increase in intensive search costs reduces the optimal accumulation of information prior to marriage. As a result, the probability of dissolution would be greater when intensive search costs were greater because the probability of entering into a mismatch—a match involving a greater variance in outcomes and possibly a lower mean outcome—would be greater. Therefore, an increase in either the cost of intensive or extensive search would increase the probability of dissolution.

Moreover, the optimal amounts of intensive and extensive search are not independent. Presumably, a person skilled at one kind of searching also tends to be skilled at the other; also, an increase in the value of one's time increases the cost of both kinds of search. Since extensive and intensive search are positively related, smaller expected gains from marriage (due to less extensive search) and less reliable expectations (due to less intensive search) tend to go together. Consequently, the expected gain and the variance in realizations are probably negatively related, not independent, as we have been assuming.

Several determinants of the cost of search are now considered. If a matching trait is rare—such as very high or very low intelligence or an uncommon race or religion—extensive search costs would be greater because persons with average traits are more readily encountered in the marriage market.[10] That is, the frequency distribution of offers to persons looking for rare traits is less dense in the region of acceptable offers.[11] Consequently, the probability of mismatches, and thus of marital dissolutions, would be greater with rare traits.

[9] Jovanovic (1976) develops a model of intensive search along these lines in the context of matching employees and firms, and derives these and other implications. For a similar model of search, see Mortenson (1976).

[10] Markets are sometimes organized in ways that facilitate marital search. Examples include dances for tall persons, social activities centered around a church, residential segregation of minorities, and coeducational universities that require considerable intelligence for admission.

[11] Wessels (1976) shows that the region of acceptable offers is wider and the probability of a mismatch greater when the distribution is less dense.

Women who become pregnant accidentally while searching for a mate have an incentive to marry quickly, even if they have not completed their search, because of their desire to "legitimate" their children, and because they become less valuable to other potential mates. Put differently, they are more likely to accept a mismatch because the cost to them of additional intensive and extensive search has increased. Therefore, accidental premarital conceptions should increase the probability of marital dissolution.

An important finding in practically every study of marital dissolution is that persons marrying much younger than average have significantly higher probabilities of dissolution. If the cost of search differed primarily because of differences in, say, the cost of time or even the incidence of premarital conceptions, persons with higher costs would marry relatively young and would be relatively more likely to dissolve their marriages.[12]

Age at marriage also depends on the degree of bias in expectations. Persons who are excessively pessimistic about their distribution of potential offers relative to the offers sampled (or excessively optimistic about the sampled offers relative to the distribution) tend to marry earlier because the sampled offers appear to be attractive compared to the value of additional search. Similarly, optimists about the distribution of offers (or pessimists about the sampled offers) tend to marry later because additional search appears attractive.

The additional evidence accruing after marriage would induce persons who were excessively optimistic about their mates to revise downward their expectations and would thereby increase the probability of dissolution. Since persons marrying at young ages are on average more optimistic, they would be more likely to dissolve their marriages. The probability of dissolution may not continue to decline with age at marriage, however. As persons continue to be unmarried, their expectations become more realistic, and they reduce their minimum acceptable income offers; they reduce their acceptable offers also because the number of years they could remain married would be declining. This is especially relevant for women, since after age 40 they have a limited capacity to bear children. A reduction of their minimum acceptable offers, however, raises the probability of dissolution because it reduces their gain from marriage. Therefore, the probability of dissolution could begin to rise for persons marrying at older ages.[13]

There is a common belief that dissolutions are evidence of marital failure that should be avoided if at all possible. Dissolution is a response,

[12] The effect of differences in search efficiency are less clear-cut. Although less efficient searchers make fewer searches, they spend less total time on search only if the elasticity of the number of searches with respect to change in efficiency is sufficiently great.

[13] The effect of a change in the opportunity cost of search is discussed in Becker et al. (1976).

however, to *new* information, favorable as well as unfavorable. Moreover, the freedom to dissolve reduces the impact of unfavorable information, and thereby reduces the incentive to delay marriage or otherwise search more in order to avoid a mismatch.

4. *Dissolution and Investment in Marital-specific Capital*

Married persons invest in many assets, including houses, children, market and nonmarket skills, and information. Some of these investments, such as in household appliances, automobiles, or knowledge of consumer prices, would be almost as valuable if marriage dissolved. Other investments, however, would be much less valuable. Children are an important example of the latter type, since one parent usually has much less contact with the children after dissolution. Other examples are sexual adjustment with one's spouse, and specialized market and nonmarket skills used relatively more while married. The investments that are significantly less valuable when single can be called "marital specific" (see Becker 1974, p. 338).

The accumulation of "general" capital does not affect the expected gain from remaining married compared to dissolution, whereas the accumulation of marital-specific capital raises the expected gain because, by definition, this capital is not as valuable when single. Therefore, the accumulation of specific capital discourages dissolution.

Of course, the causation runs in both directions: the possibility of dissolution also discourages the accumulation of specific capital because such capital is less valuable after dissolution. For example, persons with high search costs, such as those with rare traits, or persons unlucky in their search would tend to invest less in children and specific skills because their marriages have a higher probability of dissolution. They may be especially cautious in the first few years of marriage when the probability of dissolution is usually higher. Indeed, a major reason why couples search intensively during the first few years after marriage is to improve their information before they invest substantially in specific capital.

Since an autonomous increase in the probability of dissolution discourages investment in specific capital, which further increases the probability of dissolution, an increase in search costs would increase this probability partly because it induces a decline in specific-capital investment (for a proof, see Becker, Landes, and Michael 1976). Moreover, expectations become self-fulfilling in the sense that a rise in the anticipated probability of dissolution may be partly realized only because the induced decline in specific capital increases the actual probability of dissolution.

Perhaps after an initial period of caution due to uncertainty about dissolution, marital-specific capital would grow with duration, at first rapidly, then more slowly, including a possible decline at long durations.

Since specific capital reduces dissolutions, the probability of dissolution would tend to decline at a decreasing rate with duration; as the stock of specific capital eventually declined—perhaps because children grew up—dissolutions might eventually even begin to increase.

5. *Dissolution and Remarriage*

Although we have assumed that persons dissolving their marriages must remain single, the great majority in the United States eventually remarry: 80 percent of divorced males and 75 percent of divorced females remarried in the 1967 SEO survey. Even countries that forbid divorce and legal remarriage cannot prevent common law or "consensual" remarriage.[14] When remarriage is possible, the wealth expected from remaining married would be compared not only to the wealth from becoming divorced, but also to that from remarrying.

Remarriage has significant effects on the timing and incidence of dissolutions. An unexpected increase in wealth—perhaps because one mate's earnings or the other's nonmarket productivity was greater than anticipated—would increase the gain from continuing the marriage compared to becoming single again because married wealth typically would be increased by more than single wealth. The probability of dissolution would be reduced, therefore, if being single were the only alternative to remaining married. If remarriage is possible, however, the probability of dissolution might well be increased because the gain from marrying someone else could increase by more than the gain from remaining married to the current mate. For example, a more educated, attractive, competent, or healthy mate would have been selected if a person anticipated that his earnings, personality, or health would turn out as well as it did. His actual mate would try to maintain their marriage by giving him a larger share of their full wealth. But beyond some point, their combined wealth from dissolution would exceed their wealth from staying together.

This positive relation between unexpected events and the incentive to dissolve marriage can be used to reconcile the actual evidence on dissolutions with some popular beliefs. For example, it is almost universally believed that higher-income persons separate and divorce more frequently than others, yet statistical studies invariably show the opposite. Since an unusually large fraction of persons who were favorably surprised have high incomes—such as persons who married as undergraduates and became successful lawyers, physicians, or executives—popular beliefs can be dominated by the positive effect of favorable surprises on dissolutions,

[14] See, e.g., the study by Kogut (1972) of the incidence and stability of consensual unions in Brazil.

whereas the statistical evidence is dominated by the negative effect of high anticipated ("permanent") incomes.

The possibility of remarriage could greatly increase the probability of dissolution, since the realized wealth from a marriage could remain above single wealth but could be below a much higher expected wealth from remarriage. Moreover, a decrease in the expected gain from marriage compared to being single might actually reduce the probability of dissolution because the expected gain compared to remarriage could increase. For example, a reduction in the minimum acceptable marriage offer reduces the gain compared to being single but could increase the gain compared to remarriage if the distribution of offers and the minimum acceptable offer were the same in both the remarriage and the first-marriage markets.

Nevertheless, specific capital, search costs, and variables that affect the gain from marriage under certainty tend to have the same qualitative effects on the probability of dissolution when remarriage is possible as we have shown them to have when remarriage is excluded. This is obvious for the capital specific to a particular marriage—such as children—and can also be easily shown for variables like expected income and beauty that affect the gain from marriage.[15] It is less obvious for search costs because an increase in the cost reduces the value of search in the remarriage market along with the minimum acceptable offer for a first marriage.

Yet an increase in the cost of search would tend to increase the probability of dissolution even when the distribution of offers and the minimum acceptable offer were the same in both the remarriage and first-marriage markets. For one thing, if an increase in the cost of search increased the cost of intensive search (and hence the variance of outcomes from a given match) along with the cost of extensive search, the probability of dissolution would increase because a larger fraction of outcomes from a first marriage would be less than the minimum acceptable offer, which equals the value of searching for a new mate.

In addition, an increase in the cost of search increases the probability that search after marriage would reveal a preferable match. When remarriage is possible, continued marital search may be quite rational, and the frequency of extramarital relations is some evidence on the importance of such search.[16] Since an increased cost of search lowers the expected value of the offer accepted in the first marriage, it raises the probability that a random drawing from the remarriage market will

[15] A shift to the right in the distribution of offers raises the expected gain from marriage compared both to the minimum acceptable offer—which also shifts to the right but by less than the shift in the distribution—and to the "offer" from being single.

[16] Perhaps more persuasive evidence is that a significant number of persons remarry shortly after their first marriage dissolves (see the empirical evidence in table 6).

produce a better match, and much of the search after marriage may be equivalent to random search in the remarriage market. To be sure, some of the offers after marriage may not be randomly chosen and may depend on the effort devoted to finding them. Since an increase in the cost of search raises the cost of this effort as well, an increase in the cost need not be positively related to the number of attractive offers. Presumably, however, the "spontaneous" or "random" search that does raise the number of attractive offers for persons with high search costs is an important part of the total search of married persons, since their marital status often severely limits the effort they can devote to search.

We conclude that even when the distribution of offers and hence the minimum acceptable offers are the same in both the remarriage and the first-marriage markets, couples with less marital-specific capital, higher search costs, and otherwise lower expected gains from marriage and larger variances in outcomes dissolve their first marriages more readily. Consequently, our earlier analysis that neglected remarriage is still applicable when the remarriage market is not more attractive than the first marriage market.[17]

Since divorced persons tend to have lower expected gains and higher variances in outcome from marriage than persons remaining married, the average person marrying a second time would tend to have a lower expected gain and higher variance than the average person marrying a first time.[18] Therefore, the dissolution rate on second marriages of persons divorced the first time should tend to exceed the rate on first marriages.[19] More generally, the dissolution rate and the order of a marriage should be positively related.

Specific capital can also explain why second or later marriages are more likely to dissolve than first marriages, even when duration of current marriage, age at current marriage, and other characteristics are held constant. Children (and perhaps other specific capital) from previous marriages could reduce the stability of the current marriage because they are a source of friction; that is, positive specific capital in one marriage could be "negative" specific capital in a subsequent marriage.[20] Moreover, persons who dissolved their first marriage may have anticipated

[17] Moreover, several arguments suggest that opportunities in the remarriage market are *less* favorable than opportunities available before the first marriage (see Becker et al. 1976).

[18] This difference in the average expected gain on first and second marriages is reduced but not eliminated by the positive relation between the probability of remarriage and the expected gain from remarriage.

[19] On the other hand, there is little reason to expect persons who were widowed the first time to have a relatively high dissolution rate on their second marriage; for confirmation, see the empirical evidence in Section II.5.

[20] In the same way, positive specific capital in one firm could *lower* the productivity of a worker moving to another firm because he has become "accustomed" to the first firm's methods and organization and has lost some of his "flexibility."

dissolution and invested more in general ways that would be useful when divorced. These investments in turn reduce the stability of subsequent marriages by increasing the attractiveness of divorcing again. One implication, therefore, is that termination of a first marriage per se increases the probability of dissolving future marriages because of the destabilizing effects of specific and general capital from the first marriage.[21]

6. *Summary of Theoretical Analysis*

A list of the major implications derived from the theoretical analysis provides a useful summary for the empirical analysis in Section II.

1. An increase in the expected value of variables positively sorted in the optimal sorting of mates, such as the earnings of men and the attractiveness of women, lowers the probability of dissolution and raises the probability of remarriage if dissolved. The reason is that the expected gain from marriage will increase. On the other hand, an increase in the expected value of variables negatively sorted in the optimal sorting of mates, such as the earnings of women relative to those of men, raises the probability of dissolution and lowers the probability of remarriage given dissolution.

2. A larger deviation between actual and expected values, such as actual and expected earnings or fecundity, raises the probability of dissolution. The reason is that the gain from becoming divorced or from marrying someone else increases by more than the gain from remaining married to the same spouse.

3. An increase in education has an ambiguous effect on the probabilities of dissolution and remarriage. The reason is that education reduces the division of labor between mates (thus lowering the gain from marriage) while increasing the gain from any given division of labor.

4. An increase in age at marriage tends to reduce the probability of dissolution, especially at relatively young ages. The reason is that persons marrying relatively young have greater search costs and are less informed about themselves, their mates, and the marriage market. However, the probability of dissolution may begin to rise with age at marriage at relatively older ages.

5. An increase in marital-specific capital, exemplified by young children, reduces the probability of dissolution. The reason is that such capital would be worth less in any other marriage or when divorced.

[21] In the same way, separation from one job per se increases the turnover on all subsequent jobs, which can contribute to the explanation of differences in turnover rates between so-called movers and stayers. Instead of taking the differences in behavior between stayers and movers as given, our analysis probes into the underlying causes, such as differences in search costs, specific capital, properties of optimal sortings, and even luck.

Conversely, an increase in the probability of dissolution reduces the demand for marital-specific capital. Children and perhaps other specific capital may also lower the probability of remarriage and raise the dissolution rate on remarriages because they hinder the search for another mate and reduce the gain from remarriage.

6. A larger discrepancy between the traits of mates and what they would be in the optimal sorting—for example, discrepancies between intelligence, social background, religion or race—raises the probability of dissolution and lowers the probability of remarriage if divorced. The reason is that the gain from marriage is reduced. More generally, an increase in the cost of finding a suitable mate increases the probability of dissolution.

7. The probability of dissolution tends to decline as the duration of a marriage increases. The reason is that marital-specific capital, such as children, sexual compatibility, and knowledge of one's mate, increases with duration. The observed probability of dissolution would decline with duration in a given cohort of marriages not only for this reason, but also because couples with higher probabilities of dissolution dissolve their marriages relatively early; therefore, the average probability of those remaining married would decline even if each couple's probability were invariant with duration.

8. The speed and probability of remarriage depend directly on the expected gain from remarriage; therefore, they depend directly on variables like male earnings and inversely on variables like female earnings and the stock of capital specific to prior marriages (such as children from those marriages). Since marriages tend to last longer when the expected gain is greater, they also depend directly on the proxy variable, duration of prior marriages.

9. The probability of dissolution is higher in second than in first marriage, is still higher in third marriage, and so forth. The reason is that persons dissolving their marriages are not selected at random but are selected by characteristics that increase their probability of dissolution, such as lower gains from marriage. Moreover, even if dissolutions of first marriages were randomly selected, the dissolution rate on subsequent marriages would be greater because children and perhaps other specific capital from first marriage lower the gain from subsequent marriages.

II. Empirical Analysis

Fortunately, many of the theoretical implications listed above can be explored empirically using several bodies of data which give the incidence of divorce and remarriage by duration of marriage, number of children, education, earnings, age at marriage, number of marriages, and other variables. Indeed, since data on the stability of marriages are more

extensive than are data on job or residential stability, marital behavior offers a fertile area for testing a theory about the stability of contractual relations.

We have analyzed in detail two data sets: primarily, a nationwide survey of approximately 30,000 households conducted by the U.S. Bureau of the Census in 1967 (the Survey of Economic Opportunity [SEO] data), and also a survey of approximately 1,500 persons with IQs over 135 who were first surveyed in 1921 by psychologist Lewis Terman and who were resurveyed over the subsequent 50 years (the Terman Survey). These two data sets, as well as findings from many other studies, enable us to investigate extensively the implications derived in Section I.

In Section II we first present findings on first-marriage divorce rates for men and women separately and then present some evidence on the relationship between search costs, marital-specific capital, and the probability of divorce. Next we consider the likelihood of remarriage and second-marriage divorce. We conclude with a brief discussion of secular changes in divorce rates.

1. *Stability of First Marriage*

The SEO survey contains a large amount of information on the marital histories of the men and women surveyed: the number of times married, the dates of first and current marriages, the date and type of termination of first and current marriage, and, by inference, the age at marriage.[22] For the white men and white women aged 35–55 at the time of the survey we constructed eight separate data files pertaining to the stability of each person's first marriage, in 5-year marriage duration intervals beginning with the date of marriage and running through the twentieth anniversary of the marriage.[23] The frequency of divorce and sample size of each of these files is indicated in table 1.

Men.—Let P_i be the probability of divorce in the ith 5-year interval of marriage ($i = 1, \ldots, 4$), conditional upon being married at the beginning of that interval. Then the logistic function

$$P_i = 1/1 + e^{-(\beta_i X + u_i)} \tag{1}$$

was estimated by maximum likelihood separately for $i = 1, \ldots, 4$ where

$$\beta_i X = \beta_{0i} + \beta_{1i}(AM) + \beta_{2i}(AM)^2 + \beta_{3i}(S) + \beta_{4i}(A) + \beta_{5i}(E) + \beta_{6i}(E)^2, \tag{2}$$

where AM is age at first marriage S is years of schooling completed by 1967, A is age in 1967, and E is annual earnings in 1966. Table 2 reports

[22] Glick and Norton (1971, p. 308) discuss the strengths and weaknesses of the SEO data for the study of marital behavior.

[23] Persons whose marriage ended by death of a spouse were excluded; persons for whom a specific 5-year interval was interrupted by the 1967 survey were excluded from that interval. Becker et al. (1976) discuss why persons under age 35 were excluded and report empirical results for persons aged 45–54.

TABLE 1

FREQUENCY OF DIVORCE AND SAMPLE SIZE IN SEO SURVEY

	WHITE MEN		WHITE WOMEN	
	% Divorced	Sample Size	% Divorced	Sample Size
First 5 years of marriage	3.5	4,413	4.1	5,509
Second 5 years of marriage ...	2.3	4,045	3.9	5,184
Third 5 years of marriage	2.1	3,337	3.6	4,588
Fourth 5 years of marriage	1.7	2,156	2.4	3,235

TABLE 2

EFFECTS OF AGE AT MARRIAGE, SCHOOLING LEVEL, AGE, AND EARNINGS ON THE PROBABILITY OF DIVORCE, BY MARRIAGE DURATION INTERVAL (SEO White Men, Aged 35–55 in 1967)

	MARRIAGE DURATION INTERVAL (in years)			
	0–5	5–10	10–15	15–20
AM	−1.561	−.694	−.590	−.334
	(−4.59)	(−2.06)	(−1.20)	(−.33)
$(AM)^2$	.027	.013	.009	.005
	(4.38)	(1.98)	(.86)	(.22)
S	−.070	.151	−.101	.229
	(−.77)	(1.92)	(−1.21)	(2.36)
A	−.121	−.031	.082	−.034
	(−2.47)	(−.70)	(1.63)	(−.45)
E	−.334	−.181	−.177	−.310
	(−3.19)	(−1.30)	(−1.92)	(−3.01)
E^2	.004	−.000	.002	.003
	(2.74)	(−.04)	(2.32)	(1.44)
Constant.....	17.904	1.771	−.829	−.769
$\bar{P}$.....	.0351	.0227	.0210	.0172
Likelihood ratio test	46.41	12.10	20.92	13.20
N	4,413	4,045	3,337	2,156

NOTE.—The logistic function $P_i = 1/(1 + e^{-X\beta_i - u_i})$ was estimated by maximum likelihood methods, and the coefficients reported above are $\beta_i(\bar{P}_i)(1 - \bar{P}_i)$ where $\bar{P}_i$ is indicated above for each of the ith intervals. Asymptotic t-values for each β are shown in parentheses.

the estimated partial derivatives of P_i with respect to each variable, evaluated at the mean $\bar{P}_i$. The same relationships were also estimated by the OLS regression

$$D_i = \beta_i X + e_i, \tag{3}$$

where D_i is 1 if the marriage dissolved in that interval and 0 if the marriage was intact at the end of the interval. The differences in the two sets of estimates were slight.

Age at marriage (AM) has a strong negative effect on the probability of divorce at early ages at marriage and a positive effect at ages of marriage beginning near 30;[24] the impact of AM is quite strong in the early years of marriage and attenuates in magnitude and significance at

[24] The age at marriage with the minimum probability of divorce implied by the sets of coefficients are 28.9, 26.7, 32.8, and 33.4.

higher durations. A strong negative effect of age at marriage on divorce rates is one of the most widely observed correlates in the divorce literature;[25] an upturn beyond age 30 is also evidenced in census data but is not frequently recognized in the demographic literature.[26] This U-shaped effect of age at marriage on divorce is consistent with our theory (see implication 4 in Section I.6).

The effect of education on divorce is not stable in sign and generally not statistically significant. Although the simple correlations between divorce rates and education are negative, as found also in census and other data, the results in table 2[27] suggest that the effects of age at marriage and earnings explain the negative simple correlation between men's education and men's divorce rates, since these latter variables are positively correlated with education. The weak and ambiguous effect of education is not inconsistent with the theoretical analysis, for an increase in education has offsetting effects on the probability of dissolution (see implication 3 in Section I.6).

Earnings are consistently negatively related to the probability of divorce up to an earnings level of at least $40,000, and become positively related at high levels except in the second interval. Our theoretical analysis implies that a permanent increase in earnings lowers the probability of divorce,[28] and a greater deviation between actual and expected earnings increases the probability (see implications 1 and 2 in Section I.6). Since men with greater deviations in earnings are concentrated at both tails of the distribution of actual earnings, dissolutions would be especially high at the lower tail both because expected earnings are low and the deviations are large; they would then decline as actual earnings rose, but could begin to rise at the upper tail because the positive effect of large deviations could begin to outweigh the negative effect of high expected earnings. Therefore, our theoretical analysis can readily explain the initially strong negative and eventually positive relation between actual earnings and the probability of divorce.

To test this interpretation, we have reestimated the OLS regressions, replacing the variables E and E^2 by variables measuring expected earnings ($\hat{E}$) and the absolute value of unexpected earnings ($|E - \hat{E}|$).[29]

[25] See, e.g., Carter and Glick 1970, esp. pp. 234–35; Bumpass and Sweet 1972; or U.S. Bureau of the Census 1972*a*. Ross and Sawhill's (1975) linear coefficient implies that a 5-year delay in age at marriage, *ceteris paribus*, reduces the probability of divorce over a 4-year period by two percentage points (the average probability in the sample is 7.6 percent).

[26] The upturn at older ages is in evidence for all marriage cohorts since 1920 (see U.S. Bureau of the Census 1973, table 4).

[27] In an often cited study of 1960 census data, Cutright (1971, p. 293) also concludes that education of husband has no appreciable effect on the stability of first marriages when their earnings are held constant.

[28] It should also encourage earlier marriages, and this implication is strongly confirmed with the SEO survey (see Keeley 1974).

[29] For the white men in the SEO survey, the log of earnings was regressed on three sets of variables: (1) years of schooling, S, experience (defined as age $- S - 6$), X,

Expected earnings have negative, generally statistically significant, effects on dissolutions in each interval, and unexpected earnings have positive, but small and insignificant effects; both effects are in the predicted directions. A further analysis separates unexpected earnings into positive and negative deviations. Unexpectedly high as well as unexpectedly low earnings had positive effects on the probability of divorce in every duration interval, which adds additional support to our interpretation.

More direct evidence on the effect of unexpected events on the probability of divorce is available from other studies, and it supports our interpretation of the findings with respect to earnings. A spell of unemployment often indicates longer-run difficulties in the labor market that were not anticipated at the time of marriage. Our analysis then implies that persons experiencing extended unemployment would tend to have relatively high probabilities of divorce. Ross and Sawhill (1975, p. 56) find that men who experienced serious unemployment in the prior 3 years had a significantly higher probability of divorce over the subsequent 5 years. Similarly, an unexpected opportunity for remunerative employment in another community for only one spouse in families where both are employed would encourage divorce since the other spouse could be harmed by a move; hence migration would encourage divorce, and vice versa (see the analysis and evidence in Mincer 1977).

Fertility impairment is not easily identified prior to marriage, hence couples who experience sterility, spontaneous abortions, or stillbirths should be more likely to divorce. There is some evidence that women with relatively many fetal losses or child deaths are more likely to have married more than once.[30] Excessive fecundity is also difficult to predict; some evidence in the next section suggests that couples who have children too easily also have higher probabilities of divorce.

Individuals whose health changed significantly from what it was prior to marriage should also be more likely to divorce, since health changes are usually difficult to anticipate. According to evidence from the

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experienced squared, X^2; (2) S, X, X^2, and marital status; and (3) S, X, X^2, and weeks worked. (Becker et al. [1976] discuss the rationale for these three equations.) Earnings expected when marrying for the first time, $\hat{E}$, is assumed to be equal to the earnings predicted from the equation above with age set equal to 45 (with no adjustment for secular growth in earnings across cohorts—see Section II.6). "Unexpected earnings" simply equals the absolute value of the difference between actual and predicted earnings at the current age. Our estimates of expected and unexpected earnings are admittedly crude, and the magnitudes of the resulting coefficients are sensitive to the use of auxiliary regression 1, 2, or 3. Becker et al. (1976) report the results of these regressions.

[30] In one recent nationwide data set, 88 percent of *currently* married women with no child deaths were married only once, compared to less than 80 percent of those with one or more deaths. Similarly, 88 percent of *ever-married* women with no fetal loss were married only once, compared to 82 percent with one or more losses. Standardizing for the age of women does not affect this basic picture. These calculations, based on the 1970 National Fertility Survey, were kindly supplied by Anne D. Williams.

NBER-Thorndike-Hagen sample, men who report their health as either better or worse than as young men are more likely to be divorced than are men who report their health has remained about the same.[31] These results cannot be explained solely by a negative effect of marital instability on health because they hold also (although less strongly) for persons whose health has improved.

Although the estimated logistic functions in table 2 have low statistical significance, many of the estimated coefficients are significant even at the .99 level of confidence. Instead of relying exclusively on significance tests, we have tried to determine in another way whether the independent variables can discriminate among persons who divorce early, later, or never. Three separate probabilities of divorce are predicted using the coefficients for each interval and the values of the independent variables for men (1) divorcing in that interval, (2) divorcing in a later interval, and (3) still maritally stable (by 1967).

These predictions are shown in table 3. As expected, they are lowest for men still first married and highest for men who divorced in that interval. The percentage differences are reasonably large, even between the two groups who were not divorced in the interval for which the regression was estimated. Therefore, the independent variables in these regressions can discriminate between the maritally more stable and less stable.

The proportion of marriages ending by dissolution declines with duration of marriage as shown above and as implied in Section I (see implications 5 and 7, Section I.6), and most explanatory variables in table 2 have their strongest effect in the first interval.[32] In separate tests, the cumulative impact on divorce over the first 20 years of marriage of age at marriage and earnings (but not age and schooling) are considerably larger when estimated from separate duration-specific equations than when estimated while constrained to be independent of duration (see Becker et al. 1976). Moreover, the decline in the probability of divorce with duration is apparently not accounted for by changes in our explanatory variables with duration (note the pattern of the intercepts).

Women.—Comparable logistic (and linear regression) models were estimated for each 5-year marriage duration interval for white women. The logistic function was

$$P_t = 1/1 + e^{-(\gamma_t Y + v_t)} \tag{4}$$

[31] According to data supplied by Michael Grossman from NBER-TH survey, 1.9 percent of the men whose current health equalled their health when in high school were divorced, 2.6 percent of those men whose health deteriorated were divorced, and 2.2 percent of those men whose health improved were divorced (for a discussion of these data, see Grossman 1976).

[32] Selective attrition as a cohort moves through time may bias the estimated effects from interval to interval.

TABLE 3

CONDITIONAL PREDICTED PROBABILITY OF DIVORCE (SEO White Men, Aged 35–55)

PREDICTED PROBABILITY FOR MARRIAGE INTERVAL	INTERVAL-SPECIFIC PROBABILITY (%) ESTIMATED FOR MEN:			PERCENTAGE DIFFERENCES	
	Whose Marriage *Did* End in This Interval (1)	Whose Marriage Ended in a Subsequent Interval (2)	Whose Marriage Was Intact at Time of Survey (3)	(1) − (3) / (3) (4)	(2) − (3) / (3) (5)
0–5 years	4.90	4.00	3.52	39	14
5–10 years	2.68	2.55	2.30	17	11
10–15 years	2.76	2.80	2.07	33	35
15–20 years	2.74	2.05	1.70	61	21

NOTE.—Estimated for three groups using marriage-duration specific maximum likelihood estimates.

with

$$\gamma_i Y = a_{0i} + a_{1i}(AM) + a_{2i}(AM)^2 + a_{3i}(S) + a_{4i}(A) + a_{5i}(PM) + a_{6i}(C_{1i}) + a_{7i}(C_{2i}) + a_{8i}(C_{1i} + C_{2i})^2, \quad (5)$$

where PM is a dummy defined as 1 if the first birth occurred less than 7 months after the date of marriage, and C_{1i} and C_{2i} are the number of children under age 6 and between 6 and 17 at the beginning of interval i.[33]

Unlike the function estimated for men, the equations for women do not include earnings (since many of these married women did not work in 1967), but they do include the number of children at the beginning of each interval and a premarital pregnancy variable. Therefore, the regressions for women do contain variables (the children variables) that explicitly measure behavior subsequent to marriage. Consequently, the coefficients in the women's regressions, unlike those in the men's regressions, measure the effect of a variable like age at marriage net of its effect on the number and ages of children.

Table 4 reports the estimated partial derivatives of equation (4) evaluated at the mean P_i for the four 5-year duration intervals for women.[34] The effects of AM, S, and A are generally similar to the effects estimated for men in table 2, except age at marriage retains statistical significance at higher durations, and the effect of age, although consistently negative, does not have statistical significance even in the first interval.[35]

A premarital conception has a large effect on the probability of divorce in all four intervals, although it is statistically significant only in the second interval. We argued that an accidental premarital conception increases the probability of dissolution because it raises the cost of finding a suitable mate (see Section I.3 and implication 6 in Section I.6).[36]

[33] The SEO survey contains information of the birthdates of up to four children (the first two and the last two) born to each woman. For women with more than four children, birth dates for the middle children were interpolated at equal intervals between the second and penultimate child. For the first marriage interval, C_{11} was defined as of the fifteenth month of the interval instead of at the beginning of the interval. Furthermore, the analysis was restricted to women whose first child was not more than 1 year old at the date of first marriage, hence C_{21} was omitted from the first interval.

[34] Again the OLS estimates are very similar and are not discussed separately.

[35] The AM which minimizes the probability of divorce lies between age 25 and 30 except in the second interval when the logit estimate is an anomalous age 66, compared to an OLS estimate of age 32.

[36] The probability would also be increased if the children conceived prior to marriage were fathered by someone other than the current husband. This explanation is pursued in Section II.5 in the analysis of divorces from second and later marriages. Our results on the effect of premarital pregnancy are consistent with many other studies. For example, Grabill (1976, table 9) shows with 1970 census data that the instability of marriages is

TABLE 4

EFFECTS OF AGE AT MARRIAGE, SCHOOLING LEVEL, AGE, AND FERTILITY ON THE PROBABILITY OF DIVORCE, BY MARRIAGE DURATION INTERVAL
(SEO White Women, Aged 35–55 in 1967)

	MARRIAGE DURATION INTERVAL (in years)			
	0–5	5–10	10–15	15–20
AM	−1.691	−.791	−1.634	−1.331
	(−5.65)	(−1.61)	(−3.80)	(−2.22)
$(AM)^2$	.028	.006	.030	.023
	(4.49)	(.51)	(3.06)	(1.60)
S	−.100	.027	.065	−.062
	(−1.00)	(.26)	(.62)	(−.62)
A	−.049	−.060	−.018	−.008
	(−1.07)	(−1.27)	(−.37)	(−.14)
P	1.141	2.713	.745	.664
	(1.02)	(2.87)	(.72)	(.67)
C_1	−1.130	−2.403	−2.826	−2.086
	(−1.89)	(−4.02)	(−4.99)	(−3.34)
C_2	...	...	−1.435	−1.131
			(−2.81)	(−2.76)
$(C_1 + C_2)^2$	...	.405	.366	.169
		(2.43)	(4.26)	(2.66)
Constant	13.403	5.440	11.093	10.882
$\bar{P}$	.0412	.0392	.0355	.0235
Likelihood ratio test	69.80	70.72	50.79	38.09
N	5,509	5,184	4,588	3,235

NOTE.—The logistic function $P_i = 1/(1 + e^{-X\beta_i - u_i})$ was established by maximum likelihood methods and the coefficients reported above are $\beta_i(\bar{P}_i)(1 - \bar{P}_i)$, where $\bar{P}_i$ is indicated above for each of the ith intervals. Asymptotic t-values for each β are shown in parentheses.

The number of children under age 6 has a large and statistically significant effect on the probability of divorce. A child by the fifteenth month of a marriage lowers the probability of divorce within the first 5 years of marriage by one percentage point, or by about 25 percent of the mean (holding constant the premarital pregnancy variable). The effect of young children on the probability of divorce in the second and third intervals is nonlinear: for example, in the second interval, the first child under age 6 at the fifth year of the marriage lowers the probability of divorce in the next 5 years by about 2.0 percentage points; a second child lowers it by 1.2 percentage points; third and fourth children have small marginal effects, −0.04 percent and +0.4 percent, respectively; while a fifth child appears to *raise* the probability by 1.2 percentage points! The positive effect of a relatively large number of children appears to support our theoretical prediction that a greater deviation between

considerably higher among women with a premaritally conceived first child: e.g., among women first married in 1965–69, the percentage married with husband present in 1970 was 85.5 percent for women without a premaritally conceived first child, 81.6 percent for women whose first birth was within 6 months of marriage, and 70.9 percent for women whose birth occurred before first marriage.

actual and expected values of a characteristic (including control over conception) raises the probability of dissolution (see implication 2 in Section I.6).

An older child (age 6–17) has a much weaker effect on the probabilities of dissolution than does a young child. Our theory implies that children reduce the probability of dissolution because they represent marital-specific capital (see implication 5 in Section I.6); the weaker effect of older children also is consistent with this implication provided younger children embody more marital-specific capital.[37]

There has been surprisingly little quantitative evidence on the effect of children on divorce rates, although the relation between children and divorce has long been recognized.[38] With detailed evidence we find large effects of children, although these effects are not linear with respect to either number or age:[39] younger children discourage divorce more than older children do and the first two children discourage divorce more than additional children do.

2. *Search Costs and the Probability of Divorce*

Evidence from several studies indicates that discrepancies in the traits of mates (relative to that implied by the "optimal" sorting) increase the probability of dissolution. For example, considerable sociological literature has, for decades, emphasized that religious differences encourage dissolution; Landis (1949) and Bell (1938) found that the probability of dissolution was about 10 percentage points higher for a person who married outside his or her religion. Differences in education and in age also appear to increase the probability of dissolution (see Levinger 1965, p. 24).

The SEO survey is not useful in studying the effects of discrepancies because no information was collected on the traits of former spouses. The Terman survey[40] does provide such information, and Michael (1976) has

[37] There is evidence that parents spend more time with younger children than with older children (see Leibowitz 1974; Gronau 1976; Walker and Woods 1976; and for an international comparison, Stone 1972), suggesting that the care of younger children is more marital specific. In OLS regressions on the interval between the twentieth and twenty-fifth years after marriage an additional variable, number of children over age 17, was included and had an insignificant *positive* coefficient, and the effect was largest when C_1 and C_2 were zero (i.e., when there were no younger children remaining in the family). This result perhaps suggests that parents sometimes postpone dissolution until their children are older.

[38] See Monahan (1955, pp. 446–56); Jacobsen (1959); Levinger (1965, p. 24); Carter and Glick (1970, p. 36); and Plateris (1973*b*).

[39] Ross and Sawhill (1975) use less detailed and linear measures of the effects of children; perhaps this explains why they apparently "do not find . . . the presence of children has any significant effect on [marital] stability" (p. 57).

[40] The subjects were nonrandomly selected from California elementary schools in 1921 and had an IQ exceeding 135; thus they are in the top 1 percent of the IQ distribution. (For more intensive discussions of the sample, see Terman [1925–59], or Michael [1976].)

related the probability of divorce to the subject's age, education, and religion, and to the spouse's education and religion. Five separate dummy variables, one for each religion (including no religion), measure whether or not the Terman subject and spouse had the same religion. Results for women indicate that all five religion variables have large and statistically significant coefficients for divorces obtained early in marriage. The probability of divorce within the first 4 years of marriage is more than 20 percentage points lower when both have the same religion than when they differ. With the exception of Jewish marriages, the effects are about as large, although not as statistically significant, for the probability of divorce in the first 24 years of marriage.

In Section I.3 we showed that the traits of mates differ more from what they would be in the "optimal" sorting when marital search costs are larger, and that the probability of dissolution is greater when search costs are larger or when the discrepancy between the actual and "optimal" traits is greater (see implication 6, Section I.6). The findings just cited are all consistent with this implication but not with the view that persons marrying out of their religion are simply less committed to their religion, for why then would their dissolution rates be unusually high?[41]

Further evidence comes from second and later marriages. If the propensity to intermarry is partly the result of higher search costs, and if these higher costs persist into the remarriage market, divorced persons who intermarried in the first marriage should tend to intermarry in subsequent marriages and should have relatively high dissolution rates in their later marriages. The religion-intermarriage rates of Terman subjects in their first three marriages are presented in table 5. More than one-half of the Terman women and one-third of the Terman men who remarried after dissolving a first marriage with someone from a different religion, again married outside of their own religion. This is not only much higher than the fraction of religion-intermarriages in all first

[41] Additional evidence also suggests that persons who intermarry tend to have higher search costs and do not simply have different tastes or less luck in their search. A study of Jews in Indiana showed that the fraction intermarrying has been much greater in communities with relatively few Jews (where the cost of finding a satisfactory Jewish mate is greater) than in communities with relatively many Jews (Rosenthal 1970, table 2). There is also evidence that persons who marry relatively young are more likely to intermarry than persons who marry at average ages (Burchinal and Chancellor 1962; and Rosenthal 1963). The high dissolution and intermarriage rates of young marrieds are related: both reflect limited information. There is some evidence that premarital pregnancies are also more common when spouses differ in religion (see Christensen and Barber 1967), which suggests that persons marry out of their religion partly because of a premarital pregnancy. This evidence on intermarriage supports our interpretation of the relation between dissolution and age at marriage. Further support is provided by the relatively high rates of intermarriage of persons marrying (for the first time) over age 30, for we have argued that they also have relatively high dissolution rates because they gain less from marriage (see Burchinal and Chancellor 1962).

TABLE 5

THE FRACTION OF TERMAN SUBJECTS WHO MARRIED SOMEONE OUTSIDE OF THEIR RELIGION, BY ORDER OF MARRIAGE AND PREVIOUS BEHAVIOR (Information from 1950 Marital Histories)

CURRENT MARRIAGE	FIRST MARRIAGE	SECOND MARRIAGE		THIRD MARRIAGE	
		Married within Same Religion on 1st Marriage	Married outside Own Religion on 1st Marriage	Married within Same Religion on 2d Marriage	Married outside Own Religion on 2d Marriage
Women:					
Married someone of *same* religion	.88	.81	.44	.40	.50
Married someone of *different* religion	.12	.19	.56	.60	.50
No. of observations	486	26	9	5	4
Men:					
Married someone of *same* religion	.86	.82	.67	1.00	.67
Married someone of *different* religion	.14	.18	.33	0	.33
No. of observations	689	38	18	4	3

marriages but is also considerably higher than the fraction of persons who intermarried after dissolving a marriage with someone from the same religion. The presumption is that for this latter group search costs are not as high with respect to intermarriage as are the costs of divorced persons who intermarried the first time but are higher than those of all persons who married the first time. Divorced persons who did not intermarry the first time did have a higher rate of intermarriage the second time than did all persons marrying for the first time.[42]

We have argued that intermarriage is higher among Jews living in communities with relatively few Jews partly because they have higher costs of finding suitable Jewish mates. Put differently, being Jewish in these communities is a rare trait that raises the cost of search and, as a result, raises the discordance in traits between mates and the dissolution rate (see Section I.3). The Terman sample was selected on the basis of a rare trait, a high IQ: far less than 1 percent of the population has an IQ exceeding the average of this sample (148). The expectation from our theory is, therefore, that Terman subjects would both marry out of their IQ class (they would "intermarry" with respect to IQ) and divorce at relatively high rates, unless they were much more efficient searchers in the marriage market.

Although information on the IQs of the Terman subjects' spouses is limited, available evidence is consistent with our expectation.[43] It is not surprising that Terman subjects have had high divorce rates: 27 percent of Terman women had been divorced from their first husband by 1972. (There is a question, however, of whether that figure is relatively high compared to the appropriate control group; see Michael [1976].)

Since the wage rates of mates are negatively correlated in the "optimal" sorting (see Becker 1974), and since women typically earn less than men, a discrepancy between mates in this trait would generally take the form of an increase in the relative wage rate of the wife. Our theory implies that the dissolution rate would be higher when her relative wage rate is higher,[44] an implication supported by considerable evidence.[45]

[42] There is evidence that previously divorced Jews intermarry more frequently than Jews marrying for the first time (Rosenthal 1970). Moreover, the same study suggests that the relatively high intermarriage rate on remarriages of divorced persons is not a necessary consequence of remarriage, for Jewish widows do not have a high intermarriage rate on their remarriages; indeed, it is even lower than that of persons marrying for the first time!

[43] The average score on a "concept mastery" test of spouses was about one standard deviation lower than the average score for Terman subjects, even when schooling level was held constant (see Terman 1959, pp. 57–60).

[44] Even in the optimal sorting, the expected gain from marriage would be lower, and hence the probability of dissolution greater, when the wage rate of the wife relative to that of her husband was greater (see Section I.2).

[45] E.g., see Ross and Sawhill 1975, p. 56. The evidence on Terman subjects' divorces over a 20-year period is also relevant; the schooling coefficient of Terman women is significantly positive and that of their husbands significantly negative, and schooling

Interesting additional evidence comes from the effects of welfare payments on dissolutions. Welfare conditioned on the household's income is the poor woman's alimony and, like a higher wage rate for women, reduces the gain from marriage by increasing the expected income while unmarried. Consequently welfare would reduce the gain from remaining married, and, indeed, Honig (1974) finds that the fraction of both white and black households headed by females in different SMSAs is strongly related to the size of welfare payments.[46] More generally, any system of transfers in which payments depend mainly on a household's total income—be it welfare, negative income tax,[47] or aid to families with dependent children—encourages dissolutions because it compensates for the reduction in resources available to the spouses as a consequence of dissolution.

3. *Fertility and the Probability of Divorce*

In table 4 we reported a strong relation between the probability of divorce and the number and ages of children, and we presumed that the causation ran from children to marital stability. However, an exogenous increase in the probability of divorce would reduce the demand for children and for other marital-specific capital as well (see Section I.4 and implication 5 in I.6). So a negative correlation between number of children and the probability of dissolution might reflect, instead, causation from a higher probability to fewer children. A simultaneous equations model could be constructed to try to identify the causation between children and dissolution, but we decided against this strategy. Instead, we have attempted to study causation from the probability of dissolution to the demand for children by constructing a situation that largely excludes the reverse causation.

Couples with higher probabilities of dissolution tend to have less invested in marital-specific capital not only in the early years of marriage when dissolutions are more frequent, but in later years as well both because dissolution rates differ then also, and because couples would not fully compensate later for reduced investment earlier. Building on this argument, we relate the number of children of intact couples to several

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and wage rates (not included in the regression) are positively correlated (see Michael 1976). Further evidence comes from the analysis of aggregate data. Freiden (1974) finds that the fraction of women married in different geographic units is generally lower, even with age and several other variables held constant, when their wage rates are higher relative to those of men; Santos's findings (1975) are similar.

[46] By contrast, Sawhill et al. (1975) conclude from their study with the Michigan Panel Data that "there is no evidence . . . that higher welfare benefits increase separation rates among low-income families" (p. 97), but ADFC recipiency (not level of payments) "inhibits the marriage and remarriage rates of women who head families" (p. 98).

[47] See Hannan, Tuma, and Groeneveld 1976.

determinants of their probability of dissolution and to (other) determinants of their demand for children. We have restricted our analysis to couples in which the wife is over age 40 in order to measure essentially completed fertility.

From the SEO sample, the number of children ever born to white women age 40–55 with first marriage intact was regressed on a set of independent variables which includes several generally used in fertility equations and three variables intended to reflect the probability of divorce—discrepancies between spouses in race, education level, and age. Race is defined as a dummy variable equal to zero if the spouses are not of the same race and one if they are. The education and the age variables are defined as the cross-product of the education levels and of the ages of the spouses respectively; the discrepancy is greater the smaller these cross-products.[48] The race and cross-product variables are expected to have positive coefficients on fertility because smaller discrepancies in traits result in a lower probability of dissolution and thus a higher demand for children. The relevant results from this regression on 3,262 observations are as follows. With ages of husband and wife, schooling levels of husband and wife, and husband's wage and wife's age at marriage (and age at marriage squared) included in the regression, the education cross-product has a highly significant coefficient (.016, $t = 6.96$), as predicted.[49] Race also has a strong positive effect (1.00, $t = 1.90$), as predicted: racially mixed couples tend to have one less child than other

[48] Let the true demand function for children be $C = \beta Z + a_0X_h + a_1X_w + a_2[X_h - (d_0 + d_1X_w)]^2$, where X_h and X_w are the education (or age) levels of the husband and wife, respectively, and Z is other variables. The term $d_0 + d_1X_w$ gives the value of X_h that is combined with X_w in the optimal sorting; hence $d_1 > 0$ if the optimal sorting has positive assortative mating. The term in brackets is a measure of the discrepancy between the optimal and the actual value of X_h; hence $a_2 < 0$ because the probability of dissolution will be higher and the demand for children smaller when the discrepancy is greater. By expansion, $C = \beta Z + (a_0 - 2a_2d_0)X_h + (a_1 + 2a_2d_0d_1)X_w + a_2X_h^2 + a_2d_1^2X_w^2 - 2a_2d_1X_hX_w + a_2d_0^2$. Since $a_2 < 0$ and $d_1 > 0$, the coefficient of X_hX_w is positive, and the coefficients of X_h^2 and X_w^2 are negative. If $d_0 \simeq 0$, the coefficients of the linear term are unaffected by any discrepancy. Since X_h^2, X_w^2, and X_hX_w are highly collinear, we eliminated X_x^2 and X_w^2 from the regression; this biases the coefficient of X_hX_w downward—i.e., against our hypothesis—because the omitted variables are both positively correlated with X_hX_w.

[49] Other studies have also found that the interaction between the education of mates or sometimes the interaction between husband's income and wife's education has a positive effect on fertility (see Garrison, Anderson, and Reed 1968; Kiser 1968; and Ben-Porath 1974; and also Willis 1974). The interaction between IQs also appears to affect fertility (see Garrison et al. 1968) "presumably for the same reasons [that explain the similar results of education] whatever they may be" (p. 124). We have supplied a reason: couples whose IQs or educations or other traits differ from what they would be in the optimal sorting have fewer children because they have a greater probability of dissolution. Willis (1974) argues that the interaction between education levels has a positive effect on fertility because the value of the wife's time is inversely related to the degree of interaction. This may well contribute to the explanation of the findings on education and IQ but, unlike our argument, is not relevant to the related finding that discrepancies in race and religion (discussed below) also reduce fertility.

couples. The age cross-product coefficient is inconsistent with our prediction, but is very small and statistically not significant ($-.002$, $t = 1.33$).[50]

Additional evidence is available from a regression of the number of children ever born to Terman women (who first married prior to 1940 and whose marriage was still intact in 1960) on several variables including a dummy variable defined as one if the spouses were of the same religion. That religion variable has a sizable effect: the number of children is reduced by about 0.7 if spouses have different religions, which is more than one-third of the average number of children in this sample (the coefficient's t-value = 1.83). We reported in the previous section that Terman women are much more likely to divorce when they marry someone outside of their religion, so these data also indicate that the demand for children is lower among couples with a relatively high probability of dissolution.

This section has adduced evidence of causation running from the probability of dissolution to the demand for children: a high probability reduces the demand. There is a little evidence also that the demand for other kinds of marital-specific capital is reduced as well.[51] Direct quantitative evidence, as opposed to the indirect evidence in table 4, of causation running from children to the probability of dissolution is available in the evidence below on remarriages and dissolution of second marriages.

4. *Remarriage*

Divorced persons in the United States can remarry again if they choose to, and the overwhelming majority eventually do. The SEO sample is typical; more than 75 percent of divorced men and more than 70 percent of divorced women remarried within 15 years of their divorce. The word "eventually" needs to be emphasized, however, because remarriage is far from immediate. Only 31 percent of the SEO men and 22 percent of the women remarried within 2 years of their divorce, and only 48 and 43 percent, respectively, remarried within 5 years.[52]

Our theoretical analysis implies that the probability of remarriage is greater when the expected gain from marriage is greater as a result either of lower search costs or greater gains in the "optimal" sorting (see implication 8 in Section I.6). As a test of this implication, the probability

[50] Moreover, this coefficient as well as the education coefficient, is probably biased downward because of the omission (due to collinearity) of the squares of age and education.

[51] See Becker et al. (1976) for evidence on the relation between the participation in the labor force by married women and the discrepancy between their traits and those of their husbands.

[52] Since considerable time usually elapses between separation and divorce, the time between dissolution and remarriage is much longer.

of remarriage of divorced men and women in the SEO survey was related to several measures of the expected gain. The logit results reported in table 6 pertain to the probability of remarriage by the nth year after the termination of first marriage (n = 2, 5, 10, and 15 in the four regressions used in table 6).[53]

Higher earnings for men significantly increase the probability of remarriage at all four durations.[54] This is further evidence that the expected gain from marriage is increased by an increase in men's earnings (see implication 1 in Section I.6), evidence that is consistent with the findings that an increase in earnings reduces both the probability of divorce (table 2) and the age at marriage (Keeley 1974).

Persons divorced from marriages with relatively large expected gains would tend to have been married longer than other divorced persons because more time is required to accumulate a sufficient amount of adverse information to offset larger expected gains (see Sections I.3 and implication 8 in I.6). Hence the length of the first marriage can be used as a proxy for the expected gain,[55] and should be positively related to the probability of marriage. Table 6 strongly confirms this: the probability of remarriage is raised by about one percentage point for each additional year the first marriage lasted.

Education has a statistically insignificant effect on the probability of remarriage for both men and women (again, see Hannan et al. [1976] and Sawhill et al. [1975] for comparable results). These results are consistent with the weak effect of education on the probability of divorce (see tables 2 and 4), and with the implication that an increase in education has offsetting effects on the expected gain from marriage (see implication 3 in Section I.6).

Age at divorce has a generally negative effect on the probability of remarriage,[56] an effect which is stronger in magnitude and statistical

[53] Note that, whereas the divorce probabilities analyzed in Section II.1 are conditional or marginal probabilities for each successive 5-year interval, the probabilities of remarriage in table 6 are cumulated over the total n years from the end of the first marriage. Hence the coefficients in table 6 give the effect of each variable during the entire time span specified. Comparable OLS regressions here too yielded essentially the same coefficient estimates.

[54] We have also run these regressions replacing annual earnings by weekly earnings, and these regressions also exhibit a significant positive effect of earnings on the remarriage rate. Similar evidence is found in other studies (e.g., see Hannan et al. 1976, p. 87; and Sawhill, Peabody, Jones, and Caldwell 1976, p. 85).

[55] It is not surprising, therefore, that expected earnings of divorced men, a direct measure of the expected gain from marriage, and the duration of marriage are positively related.

[56] The quadratic terms in AD in table 6 imply that the probability of remarriage declines for women with age at divorce above age 22, 22, 25, and 20 in the four separate logit functions, respectively; for men the probability declines with age at divorce above age 33, 23, and 17 in the three logit functions, excluding the 10-year result in which the probability declines with AD at all levels.

TABLE 6

EFFECTS OF SELECTED VARIABLES ON THE PROBABILITY OF REMARRIAGE BY SEX, BY DURATION OF TIME SINCE THE END OF FIRST MARRIAGE (SEO White Men and White Women Aged 50–65 in 1967)

	DURATION OF TIME (for Men) SINCE END OF FIRST MARRIAGE (in Years)					DURATION OF TIME (for Women) SINCE END OF FIRST MARRIAGE (in Years)			
	2	5	10	15		2	5	10	15
AD	2.64	1.87	−1.05	2.01	*AD*	1.77	2.20	4.98	2.73
	(1.40)	(.79)	(−.32)	(.50)		(2.24)	(1.78)	(2.73)	(1.19)
$(AD)^2$	−.04	−.04	−.004	−.06	$(AD)^2$	−.04	−.05	−.10	−.07
	(1.70)	(1.13)	(.10)	(1.03)		(−3.26)	(−3.15)	(−3.83)	(−1.83)
S	.92	1.10	−.52	−1.05	*S*	−.36	−.21	−.08	−.78
	(1.14)	(1.14)	(−.50)	(−.92)		(−.94)	(−.38)	(−.11)	(1.03)
A	−.31	−.08	.21	1.51	*A*	−.74	−.32	−.09	−1.06
	(.52)	(−.11)	(.28)	(1.81)		(−2.81)	(−.83)	(−.19)	(−1.90)
E	1.21	1.70	2.54	2.95	*C*	−1.72	−1.56	−3.54	−.16
	(2.00)	(2.27)	(2.95)	(2.89)		(−2.18)	(−1.38)	(−2.47)	(−.10)
D1M	1.16	1.21	.90	.90	*NC*	5.86	30.07	44.53	46.56
	(2.45)	(2.19)	(1.54)	(1.46)		(1.29)	(3.84)	(3.72)	(3.21)
W	−8.47	−3.37	−8.16	−11.23	*D1M*	.78	1.09	1.49	.92
	(−1.46)	(−.50)	(−1.17)	(−1.57)		(2.76)	(2.72)	(2.92)	(1.57)
Intercept	−69.24	−51.73	27.41	−72.91	*W*	−11.16	−9.31	−11.16	−15.30
						(−4.40)	(−2.53)	(−2.50)	(−3.16)
					Intercept	6.40	−11.77	−47.89	59.57
$\bar{P}$	.285	.477	.636	.755	$\bar{P}$	.124	.294	.434	.621
Likelihood ratio test	21.17	16.80	19.80	26.08	Likelihood ratio test	91.21	111.48	102.36	74.77
N	354	310	261	216	*N*	991	861	684	536

NOTE.—*AD* is age at time of divorce; *D1M* is duration of first marriage in years; *W* is a dummy variable equal to 1 if the first marriage ended in widowhood and 0 otherwise; *C* is the number of children from the first marriage; *NC* is a dummy variable equal to 1 if there were no children from the first marriage and 0 otherwise; *S*, *A*, and *E* defined as in tables 2 and 4. Asymptotic *t*-values of logit coefficients are in parentheses.

significance for women. This differential effect for women is presumably partly related to the closer connection for women between age and childbearing capacity and partly to the steep decline with age in the ratio of unmarried men to women.[57]

The probability of remarriage appears to be higher for divorced persons than for widows: the widow dummy variable has a large negative effect on the probability of remarriage that is statistically significant for women. This would not be consistent with our analysis if, as seems likely, widows gain more from marriage than divorced persons; after all, persons do not usually become widowed principally because their marriage was not successful.[58]

The dummy variable distinguishing widows from divorcees implicitly assumes that they have been in the "remarriage market" equally long when the elapsed times from legal termination of their first marriages have been equal. Yet many divorced persons begin looking for another mate as soon as they separate, and some separate only *after* they have found another mate.[59] At least part of the separated time of divorcees should be included, therefore, when calculating their length of stay in the remarriage market. Since the SEO survey did not ask for the date of separation, we have reestimated the regressions underlying table 6 after simply subtracting 2 years from the date of divorce, although the separated time of most divorced persons may well exceed 2 years (see Plateris 1973*b*, pp. 15–16). The probability of remarriage in these revised regressions (not shown here) is no longer smaller for widows; indeed, the coefficient of the widow variable is usually positive, although never statistically significant.[60]

An explicit estimate of the effect of separation can be derived from the

[57] E.g., in the 1960 Census the number of unmarried men declined continuously with age, while the number of unmarried women declined to age 30–34 and rose thereafter. The number of unmarried women per unmarried man, 5 years older, fell until the men were age 30–34 and rose thereafter (see U.S. Bureau of the Census 1966).

[58] The selection of widows may not be completely independent of the success of their marriage because "unhappy" persons probably die more readily than "happy" ones.

[59] Evidence from the labor market indicates that many, if not most, persons find a new job before they quit or are laid off from their old one; in one data set almost all quits and about 75 percent of layoffs were reemployed with negligible unemployment (Bartel 1975, p. 39).

[60] The percentage remarrying is much higher for divorced than for widowed women and slightly higher for divorced than for widowed men when age at termination of the first marriage is not held constant. E.g., 5 years after termination of the marriage, 48 percent of divorced men and 43 percent of divorced women in the SEO survey had remarried compared to 45 percent of widowed men and only 21 percent of widowed women. The explanation is that widowed persons are generally older, and many more women are widowed than men. Since divorces occur much earlier and an equal number of men and women become divorced, the remarriage market is much better for the younger still-fecund divorced woman than for the older widowed woman. This interpretation is borne out by 1971 figures from the Census Bureau (see U.S. Bureau of the Census 1972*b*, table 1).

TABLE 7

REGRESSIONS ON THE TIME INTERVAL (Years) BETWEEN TERMINATION OF FIRST MARRIAGE AND DATE OF REMARRIAGE FOR TERMAN SUBJECTS MARRIED MORE THAN ONCE BY 1950 AND WITH SPOUSE PRESENT, BY SEX

Variable	Women	Men
Age at termination of first marriage	−.21 (−1.17)	−.03 (−.38)
No. of children, first marriage	1.02 (2.13)	−.19 (−.70)
Duration of first marriage (years)	.10 (.45)	−.43 (−2.64)
Length of separation in first marriage (in 6-month intervals)	−.45 (1.10)	−.20 (−1.47)
Widowed	−1.33 (−.69)	−2.90 (−2.29)
Constant	8.13	6.07
$\bar{R}^2$	.13	.17
F	1.96	3.58
Sample size	42	72

NOTE.—t-values in parentheses.

Terman survey as it includes information about the length of separation during the first marriage. The time interval between the legal termination of the first marriage and the commencement of the second marriage for the small number of Terman subjects in their second marriage in 1950, was regressed on the length of separation, a dummy indicating how the first marriage ended (widowed = 1), and other variables used in the analysis of the SEO data. The results in table 7 indicate that widows do remarry more quickly than divorced persons—the coefficient for men is statistically significant[61]—when the length of separation and other variables are held constant. Moreover, persons do appear to use their time while separated to search for another mate: both men and women tended to remarry more quickly when they were separated longer.

Children from the first marriage significantly reduce the probability that women remarry during any given period of time since legal termination of their first marriage (table 6, right-hand side) and increase the time it takes to remarry for those who do (table 7). The evidence in table 6 suggests that the number of children may be less important than the presence of any children. Our theory does imply that children reduce the gain from remarriage because they are specific to the first marriage, and they raise the cost of searching for another mate because they raise the shadow price of the mother's time (see Section I.5 and implication 5

[61] The coefficients are generally less statistically significant for women partly because many fewer Terman women had remarried by 1950 (42 compared to 72 Terman men). The regression results for men are also consistent with those from the SEO survey in two other respects: the probability of remarriage is greater for men married longer the first time and is not affected by the age at which the men divorced. These Terman results for women, however, are not consistent with those from the SEO survey, perhaps because the sample size is quite small for women.

in I.6).[62] We say "mother's time" because the children of divorced parents usually live with their mothers. Consequently, children from their first marriage should not have much effect on the propensity to remarry for divorced men; table 7, indeed, shows that, whereas children significantly raise the duration of time to remarriage of Terman women, they have no such effect on Terman men.[63]

One immediate implication of this evidence is that divorced men are more likely to remarry partly, perhaps even mostly, because divorced women usually retain custody of the children. We have crudely estimated the effect of custody by comparing the probability of remarriage of SEO men in different marriage intervals with a probability predicted for all women assuming they had no children.[64] The results are quite instructive. The *actual* frequencies of remarriage 2 years after *divorce* are 31 percent for SEO men and 22 percent for SEO women. The *predicted* frequency for women, assuming they have no children from the first marriage, is 45.2 percent, considerably above the actual probability for men![65]

The causation in the observed negative relation between children and remarriage rates rather clearly runs from additional children in the first marriage to a lower probability of remarrying. This supplements the evidence in Section II.3 that there is causation running from a lower probability of dissolution to additional children. It also reinforces our contention in Section II.1 that the observed negative relationship between children and the probability of dissolution has an important component that runs from additional children to a higher probability of remaining married.

5. *Stability of Second and Higher-Order Marriages*

More than three-quarters of persons whose first marriage ends in divorce in the United States eventually remarry; many also divorce a second time. Some remarry a third time and divorce again. Using divorce and marriage records from the state of Iowa, Monahan (1958, 1959) finds

[62] Also consistent with this interpretation is the evidence that women with illegitimate children take longer to marry the first time than do women the same age without any children (see Berkov and Sklar 1976, table 4).

[63] The SEO survey does not provide information on the children of divorced (or widowed) men.

[64] These predictions are estimated from regressions similar to those reported in table 4 but estimated for divorced women alone.

[65] The *actual* frequency for childless women was 100 percent—all 32 of the childless women remarried within 2 years of their divorce! Differences between the remarriage rates of widowed men and women are even larger than are those of divorced persons partly because widows are older and perhaps because widowed men try to remarry quickly in order to provide their children with a parent who has or will acquire child-rearing skills.

TABLE 8

REGRESSION COEFFICIENTS ON DUMMY VARIABLES INDICATING IF PREVIOUSLY MARRIED AND PREVIOUSLY WIDOWED, FROM OLS REGRESSIONS ON THE PROBABILITY OF DIVORCE, BY SPECIFIC INTERVALS, BY SEX
(SEO White Men and Women, Age 15–65)

	MARRIAGE INTERVAL (in Years)			
	Women		Men	
EXPLANATORY VARIABLE	0–5	5–10	0–5	5–10
Dummy = 1 if second or third marriage*	.138	.012	.036	.013
	(15.94)	(1.36)	(4.13)	(1.68)
Dummy = 1 if widowed in first marriage	.002	−.018	−.009	−.009
	(.13)	(1.19)	(.47)	(.51)
$\bar{R}^2$ (entire regression)	.037	.010	.011	.001
F (entire regression)	56.82	12.23	12.08	.80
N	11,960	9,627	8,688	6,948

NOTE.—t-values in parentheses. Other variables included in the regressions are age, education, age at current marriage, for men their 1966 earnings, and for women the number of children from their current marriage measured at the beginning of each interval.
* Second or third marriage for men; second marriage for women.

that the probability of divorce increases sharply with the order of marriage for persons previously divorced[66] but not for persons previously widowed.

We ran OLS regressions on the probability of divorce with the SEO data including higher order as well as first marriages. The independent variables in these regressions duplicate those shown in table 2 for men and table 4 for women, but the samples differ in that we have pooled experiences on second marriages with those on first marriages for the women and have pooled experiences on second and third marriages with those on first marriages for the men.[67] In these pooled regressions, two dummy variables were added. The first indicates a previous marriage (defined as one if the observation pertains to a second or third marriage), and the other indicates a previous widowing (defined as one if the first marriage ended in widowhood). Table 8 gives the coefficients on these two dummy variables only, taken from the full multiple regression equation.

The main findings of Monahan and others continue to hold after standardization. For women, second marriages are much more unstable than first marriages, especially during the first 5 years of marriage:[68]

[66] In 1953–55, there were 17 divorces per 100 first marriages, 35 per 100 marriages with both spouses previously divorced once, and a whopping 79 per 100 marriages with both previously divorced at least twice (Monahan 1958, table 5).

[67] For persons in their third marriage, the SEO survey did not ask how or when their second marriage terminated. We were able to include men in their third marriage by assuming that all were divorced (rather than widowed) from their second marriage, and that their second marriage terminated during its first 5 years if 10 years elapsed from termination of the first marriage to commencement of the third, during the second 5 years if 15 years had elapsed, and so on. Women in their third marriage were excluded because a significant fraction of them were presumably widowed from their second marriage.

[68] As constructed, the first dummy variable's coefficient shows the effect on the probability of dissolution of being previously divorced compared to being in the first marriage,

the probability of divorce is about 14 percentage points higher on the second than on the first marriage. However, in the first 5-year interval the probability of divorce for widows is greater than for women in their first marriage.[69]

The results for men in table 8 are similar: second and third marriages of divorced men are more unstable than first marriages of men, again especially during the initial years. Widowers are less likely to divorce after remarriage than are men previously divorced. Again, however, only in the first interval the probability of divorce is greater for widowers than for men in their first marriage.

Our theory implies that previously divorced persons gain, on average, less than others from subsequent marriages (see Section I.5 and implication 9 in I.6). Since the selection of widows is more independent of their gains from first marriage (see the evidence in the previous section), we expect marriages containing previously widowed persons to be more stable than those containing previously divorced persons.[70]

We also ran OLS regressions with the SEO data on the propensity to divorce from second marriages alone, using independent variables similar to those used for first marriages (see tables 2 and 4). Since few persons had divorced from a second marriage (for example, only 13 men divorced within the first 5 years of their second marriage), the statistical significance

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and the sum of the two dummy variables' coefficients shows the effect on the probability of dissolution of being previously widowed compared to being in the first marriage. The standardizations for age at current marriage, age and especially duration of current marriage were decisive in these findings for men and women. The explanation is mainly that persons in first marriages were generally married longer and thus had more opportunity to divorce *sometime* during their marriage.

[69] The behavior of the Terman women is also consistent with these results. By 1972, when they were about 60 years old, 27 percent had been divorced from their first husbands. More than 55 percent of the women who divorced the first time and remarried had divorced again—about twice the divorce rate from first marriages—compared to 38 percent of the (just eight) women who were widowed the first time and had remarried. Only 12 women were married a third time. Forty percent (four) of those (10) who had been divorced from both previous marriages were divorced again, whereas neither of the two previously widowed women had divorced.

[70] The theory also predicts that the average duration to divorce of those terminating their marriage should decline with marriage order because the expected gain from marriage tends to be smaller for persons previously divorced twice than for those divorced only once, and still smaller for those divorced three times, and so on. This can explain Monahan's evidence (1959, table 11) of a significant decline with marriage order in the average duration to divorce for persons previously divorced but not previously widowed. It can also explain the positive relation between the duration of the first marriage and the probability of remarriage (see tables 6 and 7), and the evidence in table 8 that the probability of divorce on second and third marriages is especially high during the first few years of marriage. However, when the SEO data are standardized for age and age at current marriage (Monahan's data were not standardized for these variables), the average duration is no longer related to marital order. Consequently, when appropriately standardized, the SEO data do not support our prediction that duration to divorce will decline in higher-order marriages.

of most coefficients is quite low. Yet, the signs of the coefficients are generally consistent with those for first marriages. For example, an increase in the earnings of men seems to reduce their propensity to divorce on second as well as first marriages, again except perhaps when earnings are quite high.

One interesting new result for women is that children from a prior marriage appear to increase the probability of dissolution from the current marriage,[71] whereas children from the current marriage appear to decrease this probability in second marriages, just as they do in first marriages (cf. table 4). Our explanation of both effects is that children are marital-specific capital: children from the current marriage increase and children from prior marriages decrease the gain from the current marriage (see implication 5 in Section I.6).

The positive effect of children from prior marriages is further evidence of causation from children to marital stability, since an exogenous increase in the probability that a second marriage will dissolve would hardly *raise* the demand for children in the first marriage. There is, however, also further evidence of causation from marital instability to fewer children: there are fewer children in higher order than in first marriages, even after age at current marriage and duration of current marriage are held constant. Since the probability of dissolution increases with marital order, the number of children would decline with order if the probability affects the demand for children.

6. *The Secular Trend in Divorce*

The number of divorces has grown remarkably during the last 125 years in all Western countries that permit divorce. For example, only two (!) divorces per year were granted in England between 1800 and 1850,

[71] The coefficients of the number of children from the first marriage are +.44, +.83, and +.52 in the first three 5-year-duration intervals, respectively. This positive effect of children from prior marriages could even be underestimated because some of the effect may be picked up by the premarital conception variable, which has a significant, positive coefficient in the first two marriage duration intervals. A premarital conception is defined as any birth subsequent to the legal termination of the first marriage and prior to the seventh month of the second marriage, so it might capture the effect of children from "prior marriages" if some of these births were conceived during the first marriage or conceived by someone other than the second husband during the time interval between marriages. When the children from prior marriages and the children conceived from premarital conceptions are combined into a single variable of children born prior to the second marriage, the coefficient is sizable and positive in the second and third intervals (t-values = 3 and 1, respectively) but negative in the first interval (its t-value, however, is less than 1). The positive effect of the premarital conception variable in the first marriage regressions (see table 4) may also be partly measuring the destabilizing effect of children from "prior" unions. Note also the evidence that women with illegitimate children not only take longer to marry (see n. 65 above) but are also more likely to divorce than are other women (see Berkov and Sklar 1976).

whereas in the past year or so there have been approximately 1 million divorces a year in the United States. Based on 1973 data it is estimated that about 40 percent of new marriages in the United States will end in divorce (see Preston 1975). The reported divorce rate in the United States (the number of divorces in the year per 1,000 married women age 15 and over) rose from 4.1 in 1900 to 8.0 by 1920 to 8.8 by 1940 to 9.2 in 1960, with sizable fluctuations, especially around World War II. Since the mid-1960s, the rate of increase has accelerated; by 1970 the divorce rate was 14.9 and by 1974, 19.3. We believe that the theoretical and empirical analyses in the previous sections can contribute significantly to an understanding of these trends and fluctuations, but here we only sketch out the main considerations.[72]

The number of children per family has been declining since the beginning of the nineteenth century in the United States, and the decline accelerated during the last 20 years. Our analysis implies both that a decline in the number of children increases the probability of divorce and that an increase in this probability reduces the demand for children; the survey evidence analyzed in previous sections has confirmed that both directions of causation are important. Presumably, both directions of causation also are at work in the secular decline in fertility and secular rise in divorce. Note, however, that the recent accelerated decline in fertility began in the 1950s, at least 5 years before the accelerated increase in divorce.

An increase in the wages of women would reduce the gain from marriage, even when the wages of men increased at the same rate, because the sexual division of labor between market and nonmarket activities would decrease, and more married women would enter the labor force. Therefore, the secular growth in wages, which contributed significantly to the growth in the labor force participation of women, especially married women, probably also contributed significantly to the growth in divorce rates. Again causation probably flows both ways: divorced women (and women who anticipate divorce) have higher wages because they spend more time in the labor force.

Legal access to divorce became much easier during the last 100 years in the United States, Great Britain, and most other Western countries. Although we believe this trend toward easier divorce has been mainly a response to the increased demand for divorce, it may also have been responsible for a small part of the growth in divorce. Whatever the causation, the ease of obtaining a divorce and the fraction of women married are positively correlated across states, even after age and many other variables are held constant (see Freiden 1974 and Santos 1975).

One of the most provocative trends in recent years is the rise in ille-

[72] Michael has begun a systematic analysis of the trend during the last 2 decades.

gitimacy despite the improvements in contraceptive technology and easing of legal restrictions on abortions. According to our evidence on the effect of "prior" children, illegitimacy should raise the probability of divorce. However, the rise in illegitimacy may be responding to the same forces that raised the divorce rate, namely, both may be responses to a decline in the gains from marriage.

A growth in the divorce rate itself encourages additional divorces because the remarriage market is better when there are more divorced persons available. There is evidence in table 6 that the remarriage market did improve as the divorce rate grew over time, for the probability of remarriage during the first few years after a divorce also grew over time. Moreover, the sharp acceleration in divorce rates that began in the 1960s may have been partly caused by the prior growth in divorce rates.

Tables 2 and 4 provide some evidence on the trend in probability of divorce. The estimated trend is measured by the coefficient on age, but its interpretation across marriage intervals is subject to several qualifications (see Becker et al. 1976). While nearly all the estimated trends are positive, the only significant one suggests an increase in the probability of divorce of about 1 percent per decade over the time span covered by the SEO data (1920s to early 1960s). These estimates of the trend in divorce rates are *net* of standardizations for trends in age at marriage, years of schooling, earnings of men, and the number and ages of children born to women. These standardized estimates may be biased because standardizing with differences across households in earnings, education, or age at marriage does not correctly provide for the effect of secular changes in these variables.[73] Moreover, these estimates have not been corrected for the effect of changes over time in the earnings of women, divorce laws, the size of the remarriage market, and other variables that contributed to the observed trend in divorce rates.

[73] Even though an increase in male earnings or age at marriage significantly reduces the probability of divorce when comparing different households at the same moment in time, the relation between the secular increase in divorce rates and the secular changes in these variables is less clear. An increase in the earnings of one man relative to the earnings of other men in the marriage market increases his gain from marriage partly because he is able to attract a woman with more desirable attributes. On the other hand, when the earnings of all men increase, with little change in the distribution of the attributes of women, all men cannot be sorted with more desirable women. Consequently, an increase in the earnings of any man would have a smaller effect on his gain from marriage and thus on his probability of dissolution when the earnings of other men also increase. A similar argument can be made for general increases in education levels, and related arguments can be made for a decline in the average age at marriage. Therefore, the large secular growth in male earnings may not have greatly reduced, and the secular decline in age at marriage may not have greatly increased, the propensity to divorce.

The appropriate way to standardize for differences in earnings also partly depends on the life cycle in earnings. If, for example, a 35- and a 45-year-old person had the same earnings in 1966, the younger person would generally have the higher earnings profile because earnings tend to increase between ages 35 and 45.

7. *Summary of Empirical Analysis*

Many of the more important theoretical implications are listed in Section I.6. The empirical analysis using the 1967 SEO and 1920–60 Terman data, as well as the findings in many other studies, strongly support these implications and are also of interest in their own right. The main empirical findings are as follows.

1. An increase in the expected earnings of men reduces the probability of dissolution on first marriages, raises the speed and probability of remarriage if the first is dissolved, and reduces the probability of dissolution on second or higher-order marriages. An increase in the expected earnings of women, on the other hand, has the opposite effects: it appears to raise the probability of dissolution and to reduce the propensity to remarry.

2. Unanticipated events, whether favorable or unfavorable, tend to destabilize marriage. For example, either unexpectedly high or low levels of earnings of men or difficulties in conceiving children appear to raise the probability of divorce.

3. An increase in the number of children, especially younger children, from a first marriage reduces the probability of dissolution of that marriage, and the speed and probability of remarriage for mothers with custody. Indeed, if divorced women did not usually receive custody, their propensity to remarry would not be less than that of divorced men. Although children from second and higher-order marriages also lower the probability of dissolution in these marriages, children from first marriages apparently raise the instability of subsequent marriages.

4. An increase in the probability of dissolution, as measured in our empirical work by the propensity to marry outside of one's religion, race, or education or IQ class, reduces the demand for children and for other marital-specific capital, such as skills highly specialized to the nonmarket sector. Findings 3 and 4 together indicate that the observed negative relation between the probability of divorce and children involves causation running in both directions.

5. A person who marries outside of his or her religion is much more likely to dissolve the marriage, to marry out of his religion if he does remarry, and then to divorce again. Moreover, even if a divorced (but not a widowed) person married in his religion the first time, he is rather likely to marry outside his religion the second time. The propensity to marry outside of one's religion, and then to dissolve the marriage, is partly related to the number of potential mates of the same religion that is available.

6. Persons who marry relatively young are far more likely to dissolve their marriages than are those who marry at "normal" ages. This has been well known, but less well known is our finding that persons who

marry for the first time relatively late—for example, in their early thirties—have the highest probabilities of dissolution.

7. The propensity to remarry is positively related to male earnings, the absence of young children, the length of time separated before legal termination of the first marriage, and the duration of the prior marriage (a variable that serves as a proxy for unmeasured determinants of the expected gain from marriage). Widowed men or women are more likely to remarry than are divorced women or men, after allowance is made for age at legal termination and some other variables.

8. The probability of dissolution is much higher on second marriages, and still higher on third marriages, for persons previously divorced but not for persons previously widowed.

Most of our empirical evidence involved different households at a moment in time. Yet a limited examination of evidence on trends in divorce rates suggests that our theory can also contribute significantly to understanding the secular growth in divorce, including the acceleration which began in the 1960s. The most important variables appear to be the decline over time in number of children, the growth in labor force participation and earnings power of women, the growth in the breadth of the remarriage market as more persons become divorced, and perhaps also the growth in legal access to divorce, illegitimacy, and public transfer payments.

III. Concluding Remarks

We recognize that the statistical significance of many empirical findings from the SEO survey is weak, especially in view of the usual amount of experimentation involved in empirical economic research. Yet we believe that the empirical evidence in Section II as a whole tells a consistent story that offers significant support for the theory developed in Section I. The evidence is adduced from many data sets, analyzed by many different researchers, and encompasses individuals in quite different income, education, religion, and family background categories. The data sets include a large cross-sectional survey with oversampling among low-income families, a large, more representative sample that follows persons for several years, a small sample of "geniuses" followed for 50 years, and other data including a small sample of Jewish and Catholic marriages, a sample of women in California with illegitimate children, and samples from the divorce registry in Iowa. The determining variables in the various analyses conducted or referenced here include earnings, education, and health of men and women, age at marriage, duration married, "intermarriage" by religion, race, age, and education, illegitimate children, and legitimate children from first and later marriages, and divorces from second and third as well as first marriages.

It is easy to develop special theories to explain specific findings on marital dissolution, and many have been suggested. It is a challenge to find a single theory that adequately explains the rich set of findings reported in Section II. The theory advanced in Section I, based on utility maximization under uncertainty by participants in marriage and remarriage markets, passes this test reasonably well. We suspect that the theory will do even better when it is more fully developed, with the significant remaining gaps filled in. These gaps include a derivation of the equilibrium sorting of mates when there is uncertainty about traits and a more satisfactory treatment of the interactions between the possibility of remarriage, optimal extensive and intensive search, and first marriage divorce.

The approach to marital dissolution developed here should also prove useful in analyzing the dissolution of (implicit as well as explicit) contracts of indefinite duration between employees and employers, business partners, friends, etc. The case for a common theoretical approach to all social behavior would be greatly strengthened if the same theory is applicable to employee turnover and the termination of friendships, as well as to marital dissolutions.

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