NBER Working Paper Series

ECONOMICS OF MARITAL INSTABILITY

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Working Paper No. 153

CENTER FOR ECONOMIC ANALYSIS OF HUMAN BEHAVIOR
AND SOCIAL INSTITUTIONS

National Bureau of Economic Research, Inc.
204 Junipero Serra Boulevard, Stanford, CA 94305

October 1976

This study has been partially supported by grants to NBER from the National Institute of Child Health and Human Development, DHEW: The Rockefeller Foundation; and by NBER. The authors wish to thank Michael Grossman, Michael Keeley, participants of workshops at the University of Chicago, Columbia University, NBER-West, and University of Rochester for comments, and Barbara Andrews, Kyle Johnson, and Richard Wong for valuable research assistance.

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ABSTRACT

This paper focuses on the causes of divorce. Section I develops a theoretical analysis of marital dissolution incorporating uncertainty about the outcomes of marital decisions into a framework of utility maximization and the marriage market. Section II explores the 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 the U.S. divorce rate is discussed.

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Introduction

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 15 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 marriage, but perhaps ten times as high a probability of being separated by divorce.[2]

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 are discouraged when the probability of divorce is high. Surely the rise in women's labor force participation rates and the fall in fertility rates in the past two decades have partly been caused by, as well as causes of, the rise in marital instability.

Although 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 acceleration during the last 15 years?

We believe that these causes can be discovered by building on and 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 to say, persons separating presumably had less favorable outcomes from their marriage than they expected when marrying.

The first part of this paper 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. The analysis 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.

The second part of this paper tests these implications with several bodies of cross-sectional data, primarily the 1967 Survey of Economic Opportunity and a group of "geniuses" that Terman and his associates have followed for about 50 years. Evidence from many other studies and from time series is also discussed. For the most part, the evidence strongly confirms the theoretical predictions.

SECTION I: THEORETICAL ANALYSIS

I.1 Basic Framework

Households are assumed to use the nonmarket time and market goods of their members to produce a set of nonmarketable commodities. Each person maximizes the utility from the commodities that he 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.

Figure 1 illustrates two lifetime streams of commodity income assuming perfect certainty (i.e., accurate anticipation of the commodity income in every year). The curve S shows the commodity income stream if the person never marries: income rises at a decreasing rate until it peaks at a late age, and then falls until death at t_n^s. The curve M shows his or her income stream from a more complicated set of choices: single until marriage at t_1, married until divorced at t_2, remarried at t_3, and married until death at t_n^m.

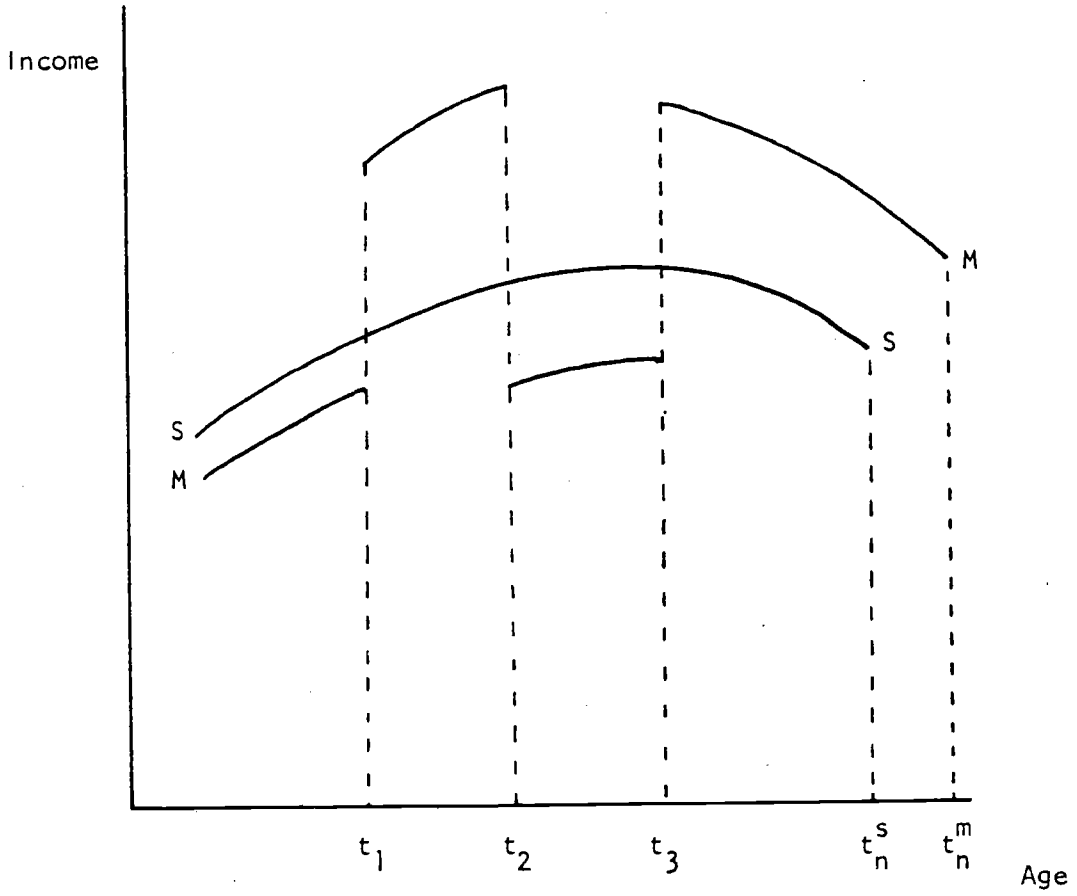

Figure 1

Although the individual is single until t_1 with both streams S and M, his income is lower during this interval with M because he is anticipating and investing for the marriage at t_1. His income jumps at marriage and remains above S while married because of children, the division of labor, and other gains from marriage (see Becker, 1974). It falls below S after divorce because S-investments are more oriented to being single than are M-investments. It again rises above S during the second marriage. The figure incorporates the finding that marriage apparently lengthens life expectancy (see Fuchs 1974a).

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. In Figure 1, unless the discount rate were very high, strategy M would be preferred to strategy S: marriage, dissolution, and remarriage would be preferred to remaining single because of the gains from marriage. If strategy M were preferred to all other strategies as well, not only marriage but also dissolution and remarriage would be anticipated because of their benefits. 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.[3] 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.

Consider, for example, a person who would receive $1000 of commodity income in each of two remaining periods if he were single in both, and an expected income of $1200 in each if he were married in both. Suppose the marital income is uncertain, however, and the $1200 expected income results from a 50 percent chance of $800 in each of the two periods and a 50 percent chance of $1600 in each of the periods. Clearly, his optimal strategy is to marry in the first period, for his expected full wealth would be lower with any strategy that had him single in this period. Whether he wants to remain married in the second period depends on the outcome in the first: he would remain married if his income were $1600, and would divorce and become single (thereby receiving say $900 rather than $800 in the second period) if his income in the first were only $800.

In one sense, the divorce in the second period is anticipated because the person knows that he will divorce <u>if</u> he receives only $800 in the first period. However, in a more fundamental sense, the divorce is an unexpected consequence of an undesirable outcome in the first period, for he would not marry could he correctly anticipate that he would receive $800. He could do better by remaining single in both periods.

The analysis can be readily generalized to include many periods, continuous variation in outcomes, and choice among many potential marriage mates. The optimal marital decision at any moment would be the one that maximized the expected value of remaining full wealth, given the realizations

prior to that moment. The optimal strategy would be the set of all these optimal decisions. The optimal strategy 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.[4]

With divorce viewed in a stochastic framework, it is natural to consider the probability of divorce as a function of two parameters: gain from marriage and the distribution of a variable describing unexpected outcomes. Suppose the individual anticipates at the time of marriage that the net gain from remaining married beyond time t is $\hat{G}_t (\hat{G}_t > 0)$, whereas the gain evaluated at time t is $G_t = \hat{G}_t + e_t$, where e_t is a stochastic term with the density function $F(e_t)$, mean $\bar{e}_t$ and variance σ_t^2. A positive e_t reflects an initially unanticipated positive gain from the marriage, while a negative e_t reflects an initially unanticipated loss. The probability that the individual will wish to divorce at time t is equal to the probability that $\hat{G}_t + e_t < 0$, which equals $\int_{-\infty}^{-G_t} F(e_t)de_t$. Therefore, the probability of divorce is greater the smaller $\hat{G}_t$, the lower $\bar{e}_t$, and the larger σ_t^2. That is, the probability of divorce is greater the smaller the average unanticipated gain from the marriage (or the larger the average unanticipated loss), and the greater the variation in the unanticipated outcome.

We suggest that the clear majority of divorces result 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 seven years, and three-quarters

of all divorces take place before the fifteenth anniversary of marriage.[5] 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 didn't have any 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 judgements 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 their expected married-wealth were greater than their combined expected separated-wealth while one spouse expected greater separated-wealth, the other spouse would be able to bribe the first to remain married. Likewise, if their combined separated-wealth were greater than their married wealth while one spouse expected less separated-wealth, he or she could be bribed 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 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.

If the division were not flexible, dissolution could be opposed by one mate if his separated-wealth were less than his married-wealth, even though their combined separated-wealth would exceed their married wealth. Although contested divorces are well publicized, the fact is that over 85 percent of divorces granted since the 1880's have not been contested.[6] The low incidence of contested divorces provides some evidence that the division between mates is not so rigid. 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 -- such as dowries and bride prices -- introduce more flexibility into marital divisions.

Although marital separations are easily obtained in practically all countries, some forbid divorce, others require mutual consent, and still others require extenuating circumstances -- adultery, impotence, insanity, desertion, etc. When mutual consent is required, not only must the combined wealth of divorcing couples exceed their combined marital wealth, but the wealth of each must also be raised by divorce. Therefore, the requirement of mutual consent insures that the benefits are shared; one mate could not gain from a divorce largely at the expense of the other.

If the division of wealth between spouses is sufficiently flexible, it is not 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 pre-divorce 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; it 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.

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 improve-

ment 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).[7]

I.2 Dissolution and Expected Gains from Marriage

We indicated above that 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 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 a lower probability 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 his market productivity compared to his nonmarket productivity if he spends more of his time in the market sector after he is married as a result of substitution of his spouse's time for his in the nonmarket sector. Conversely, he will specialize more in acquiring nonmarket skills if he spends more of his time in the nonmarket sector after marriage.

Therefore, the gain from marriage compared to being single also depends 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 stay married can explain, among other things, 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.[8]

As another example, consider men with relatively[9] 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.

The effect of specialized investments on the gain from marriage does <u>not</u> reinforce the effect of optimal sorting, however, for persons with relatively high levels of education. On the one hand, marriages between highly educated individuals have greater gains because of the spouses' high levels of education and other market and nonmarket characteristics. On the other hand, they may have lower gains because they typically involve less 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 education on the gain from marriage.

I.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. 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, a million dollars, a height in excess of 6'6", 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 a more "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 change the expected gain from marriage, especially for persons with certain characteristics.

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 <u>couples</u> gain less (or at least do not gain more) than in the "optimal" sorting, some <u>persons</u> 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.[10] Each person spends resources selecting a drawing from a frequency distribution of potential mates; each drawing gives the wealth that can be expected from 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 foregone by remaining single rather than marrying an available match. That is, the cost of searching one more period is $c + (I^a_{mf} - I_{mo})$, where c is the direct search cost, I_{mo} is the expected income from remaining single for the period, and I^a_{mf} is the expected income during that period from marrying the best available potential spouse. The term in parentheses is included in the cost only if it is positive. If it were negative, the expected opportunity cost of remaining single is zero. The expected benefit from continuing to search equals the product of the probability of finding a preferable mate, α, times the expected increase in wealth from finding a preferable mate, $G^a = (\bar{W}_{mf} - W^a_m)$, 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:

$$\alpha G^a = \alpha(\bar{W}_{mf} - W_m^a) = c + (I_{mf}^a - I_{mo}), \qquad (1)$$

or when

$$I_{mf}^a = \alpha G^a + I_{mo} - c \equiv V_{mf}, \qquad (2)$$

where V_{mf} is the value of additional search.

The discussion is illustrated in Figure 2, where gg is the frequency distribution of expected wealth offers from different matches, and W_{mo} is his expected wealth from remaining single. If the cost of search equalled c^o and the minimum acceptable wealth offer was $W_{mf}^{a_o}$, the resulting average wealth from all acceptable offers would be $\bar{W}_{mf}^o$ and the expected gain from an acceptable match would be G^o. An increase in search costs to c^1, everyone else's costs remaining the same, would lower the minimum acceptable offer to, say $W_{mf}^{a_1}$. Consequently, the average acceptable wealth would be lowered to $\bar{W}_{mf}^1$ and the expected gain from an acceptable match would be lowered to G^1. Since we have shown that marital dissolutions are more frequent when the expected gain is smaller, dissolutions would increase when search costs increase.

Actual marital offers differ even among persons with the same search costs and the same frequency distribution of offers. Some will be "lucky", receiving better offers than $\bar{W}_{mf}^o$ in Figure 2, 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).[11] The upper and lower bounds of this set are depicted as A^u and A_ℓ in Figure 3. The expected wealth from a

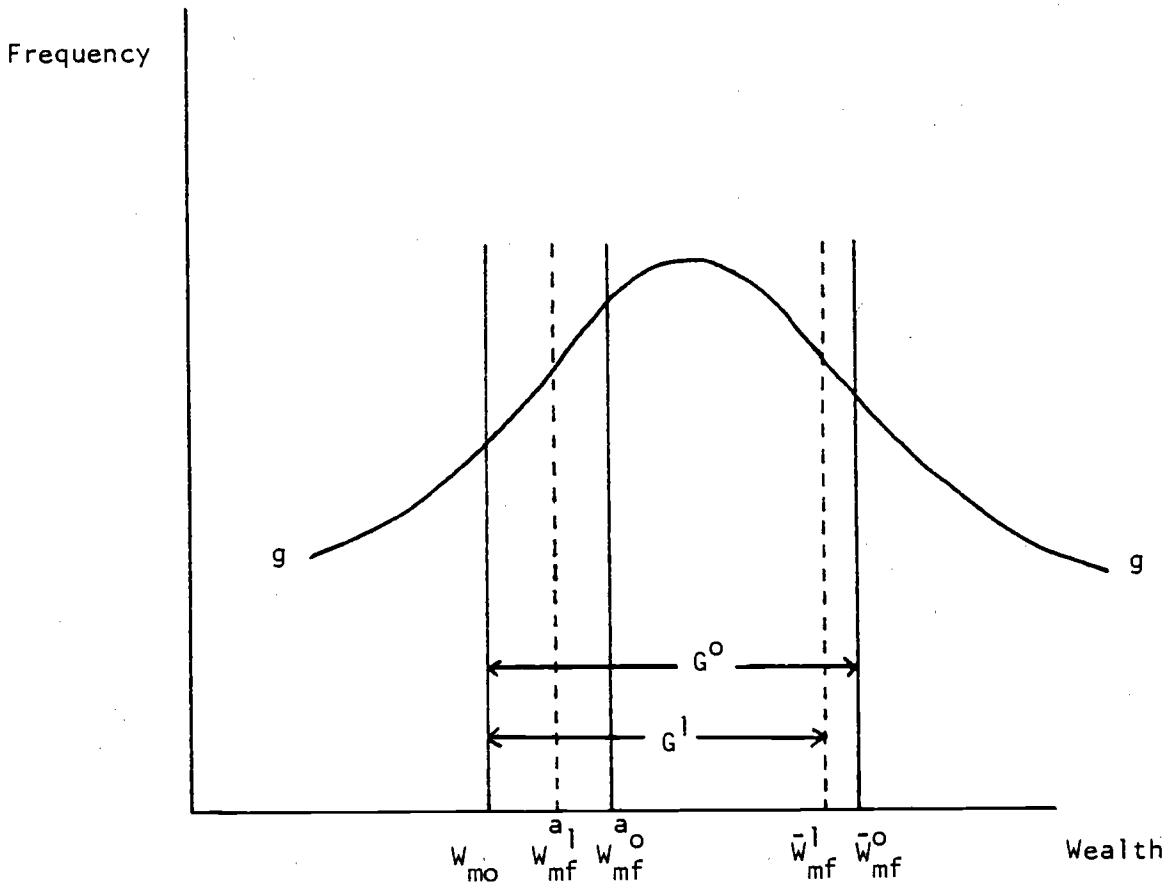

Figure 2

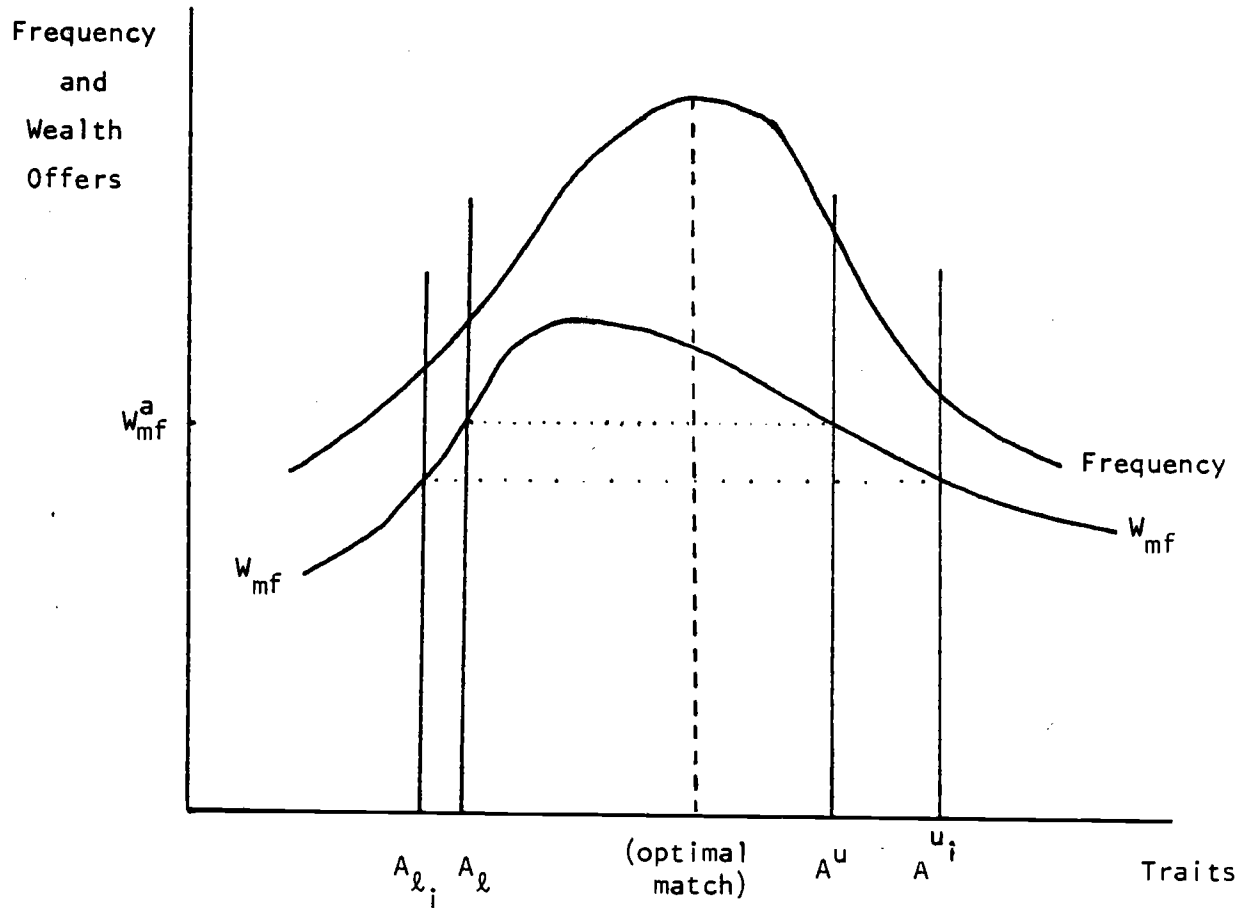
Frequency
and
Wealth
Offers
W^a_{mf}
W_{mf}
Frequency
W_{mf}
A_{ℓ_i}
A_ℓ
(optimal
match)
A^u
A^{u_i}
Traits

Figure 3

match with either trait A_ℓ or trait A^u must equal the value of additional search when these matches are available. That is, these matches must both satisfy equation (1) and 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 one's offers must exceed the value of search in the interior of the acceptable set, these offers would exceed the offer at the boundaries.[12] In Figure 3 we assume the wealth offers rise continuously with A from the lower boundary to a peak somewhere near the "optimal" match, and 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.

The relationship between Figures 2 and 3 is such that a movement to the left along the distribution of wealth offers in Figure 2 corresponds, although not perfectly, to a movement in either direction away from the "optimal" matching trait in Figure 3. 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 3. 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.

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};[13] 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. In addition, an expansion or contraction of all (or just some) male boundaries due to an increase or decrease in their search costs would mean that all (or just some) female boundaries are induced to expand or contract.

Note that although the expected duration of a marriage would be shorter when the "mismatch" was greater, this does not per se reduce the incentive to accept a "mismatch." On the contrary, the freedom to dissolve a marriage in response to unfavorable events or information about the marriage (or favorable events or information about being divorced) reduces the effect of this information on expected wealth, and thereby increases the incentive to accept a "mismatch". This conclusion is relevant in evaluating the belief that dissolutions are evidence of marital failure that should be avoided if at all possible. Dissolution is a response to unfavorable information, and favorable information is obviously preferable, but 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." The incentive to invest in marital specific capital would however, be smaller the greater the mismatch (see section I.5).

In addition to the "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 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 the match. 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 match because only matches with favorable realizations survive long durations.[14]

The 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, an uncommon race or religion, blindness or deafness -- extensive search costs could be greater because persons with average traits are more readily encountered in the marriage market.[15] That is, the frequency distribution of offers to persons looking for rare traits is less dense in the region of acceptable offers.[16] Consequently, the probability of "mismatches," and thus of marital dissolutions, would be greater with rare traits.

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. 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 marriage.[17]

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 probably become more realistic, and they reduce their minimum acceptable income offers; they would also reduce their acceptable offers 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 significantly limited capacity to bear children. A reduction of the 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 relatively older ages.

We have said little about the opportunity cost of search, i.e., the income foregone by remaining single and continuing to search intensively and extensively instead of accepting the best available offer. An increase in opportunity costs, say due to a decline in a person's single income, reduces the amount of search. The probability of dissolution is increased by the reduction in search

because less accurate information would be acquired about any match, but the reduction in single income raises the expected gain from any given match, which in turn lowers the probability of dissolution.[18] The net effect would be an increase in the probability of dissolution only if the reduction in information dominated the increase in expected gains.

I.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 to them if their marriage dissolved. Others, however, would be much less valuable to them if their marriage dissolved. Children are an important example of the latter type, since one parent usually has much less contact with their children after dissolution. Other examples include information acquired about one's spouse, sexual adjustment with one's spouse, and specialized market and nonmarket skills used relatively more while married, because single persons engage in less extensive division of labor between the market and nonmarket sectors. 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, say, search costs would increase this probability partly because it induces a decline in specific-capital investment.[19] 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 dissolution; as the stock of specific capital eventually declined -- perhaps because children grew up -- dissolutions might eventually even begin to increase.

I.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 eventually remarry.[20] Even countries that forbid divorce and legal remarriage cannot prevent

common law or "consensual" remarriage.[21] 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. Dissolution would be warranted when the wealth from remaining married was less than the best alternative, including remarriage by one or both mates.

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 in Figure 2 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 -- or for variables like expected income and beauty that affect the gain from marriage.[22] 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.

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 divorced because married wealth typically would be increased by more than single wealth. The probability of dissolution would be reduced, therefore, if being divorced were the only alternative to remaining married. If remarriage were 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, beautiful, 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 favorable outcomes 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, whereas the statistical evidence is dominated by the negative effect of high anticipated ("permanent") incomes.[23]

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.[24] 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 produce a better match. To be sure, 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 preferable 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. This conclusion

is reinforced by several arguments suggesting that opportunities in the remarriage market are less favorable than opportunities available before they married. (1) Until recently the remarriage market has been "thin" because only a small fraction of couples divorced.[25] (2) Divorced women's participation in this market has been handicapped by custody of children from first marriages: children raise the cost of searching for another mate, and discourage many potential mates.[26] (3) Divorced persons are also older than those entering the first marriage market, and older persons tend to gain less from marriage, especially if they do not want or are unable to have additional children.

By suggesting that opportunities in the remarriage market are less favorable than those in the first-marriage market we mean, formally, that the difference between the mean of the distribution of offers in the remarriage market and non-married wealth is smaller than the difference between the mean of the distribution of offers in the first-marriage market and single-wealth. So the minimum acceptable offer of each person would be closer to non-married-wealth in the remarriage market than in the first-marriage market. Indeed, the minimum acceptable offers of some persons, especially persons with smaller acceptable offers in the first-marriage market, would be reduced to the level of non-married-wealth, and these persons would not want to remarry.[27] The earlier analysis that ruled out remarriage would be directly applicable to these persons,[28] and they would not search for another mate.

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.[29]

Therefore, the dissolution rate on second marriages of persons divorced the first time[30] should tend to exceed the rate on first marriages. 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.[31] Moreover, persons who dissolved their first marriage may have anticipated dissolution, and invested more in general ways that would be useful when divorced or in other marriages. 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 capital from the first marriage.[32]

I.6 Summary

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 beauty 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 are less informed about themselves, their mates, and the marriage market. The probability of dissolution may begin to rise with age at marriage at relatively older ages, however, as the marriage market becomes "thin" and the gains from marriage begin to decline.

(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. 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 -- e.g., 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 also because couples with higher probabilities of dissolution dissolve their marriages relatively early, so 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 male earnings, and inversely on female earnings and the stock of capital specific to prior marriages (such as children from those marriages). They also depend directly on the duration of prior marriages because marriages tend to last longer when the expected gain is greater.

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

SECTION II: EMPIRICAL ANALYSIS

Fortunately, many of the theoretical implications listed above can be explored in detail 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 relatively 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 1500 persons with IQ's over 135 who were first surveyed in 1921 by psychologist Lewis Terman, and who were resurveyed periodically over the subsequent fifty years (the Terman Survey). These two data sets, as well as the findings from many studies that use other data, enable us to investigate many of the implications about marital behavior derived from the theory in Section II.

The outline of Section II is as follows. 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 the divorce rates.

II.1 Stability of First Marriage

Men. The SEO survey contains information on the number of times married, the dates of first and current marriages, and the date and type of termination of each marriage.[33] From this information we constructed separate data files for men and women containing information on the stability of each person's first marriage in five-year intervals beginning with the date of marriage, and running through the 25th anniversary of the marriage. There are, for example, 4413 white men aged 35-55 in 1967 for whom we know whether their first marriage was still intact at the time of the fifth anniversary of their marriage. Of that group, 3.51 percent had divorced by the fifth anniversary and the remainder were still married.[34] Likewise, there are some 4045 men whose first marriage was still intact at the fifth anniversary of the marriage and whose tenth wedding anniversary had occurred prior to the time of the SEO interview; 2.27 had divorced prior to the tenth anniversary. The SEO survey also contains information on the income and education in 1967 of each person sampled, and the birth-dates of four children (the first two and the last two) born to each woman.[35]

The following OLS regession[36] was estimated for males aged 35-55 for each five-year marriage duration interval separately:

$$D = a_0 + a_1 (AM) + a_2 (AM)^2 + a_3 S + a_4 A + a_5 E + a_6 E^2 + u,$$

where:

D = 1 if the first marriage dissolved in that marriage-duration interval and 0 if the first marriage was still intact at the end of that interval

AM = age at first marriage

AM^2 = square of AM

S = years of schooling completed by 1967

A = age in 1967

E = annual earnings in 1966

E^2 = square of E.

Table 1, columns 1-5 gives the implied partial effects of the four explanatory variables on the probability of divorce within each five-year interval.[37] The bottom panel gives the means and standard deviations of the variables in each of the five subsamples. Since men were included in the subsample only if their first marriage was intact at the beginning of the interval and the full five years had elapsed before the survey date in 1967, the mean age of the subsample tended to be older and the mean age at marriage younger at later durations (e.g., in the first five-year interval, the mean age was 44.7 and the mean age at marriage was 23.9, whereas by the fifth interval they were 50.9 and 22.0 respectively).[38]

An increase in age at marriage has a strong negative effect on the probability of divorce at relatively early ages at marriage, but the effect gets smaller at later ages and consistently turns positive at ages of marriage above 30.[39] The strong negative effect of age at marriage on divorce rates is one of the most widely observed correlates in the divorce literature;[40] an upturn beyond age 30 is also evidenced in Census data but is not so frequently recognized in the demographic literature.[41] The initial strong negative effect and the eventual positive effect of age at marriage on divorce are both quite consistent with our theory (see implication (4) in Section I.6).

The effect of education on divorce is generally not statistically significant and not even stable in sign. Although the simple correlations between divorce rates and education are negative, as found also in Census

Table 1. Implied effects on the probability of divorce in five-year intervals. SEO white men, aged 35-55. (Estimated from marriage-duration specific OLS regressions.)

	Marriage interval					Implied 25-year effects	Cumulative 5-year effects from pooled regression
	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years		
	(percentage point effects)						
Age at marriage:							
marry at 20 instead of 15:	-4.0*	-1.5	-1.9	-1.2	+2.1	-7.2	-5.6%*
marry at 25 instead of 20:	-2.1*	-0.8	-1.3	-0.7	+2.0	-4.2	-3.1*
marry at 30 instead of 25:	-0.3*	-0.0	-0.6	-0.2	+1.9	-1.2	-0.5*
marry at 35 instead of 30:	+1.6*	+0.7	+0.0	+0.3	+1.8	+1.8	+2.0*
Schooling: 4 additional years:	-0.3	+0.6	-0.4	+0.9*	-0.0	+0.8	+0.6*
Age: 10 years younger in 1967:	+1.1*	+0.3	-1.0	+0.2	-0.4	+0.2	+1.0*
Earnings:							
$7,000 instead of 3,000	-1.1*	-0.7	-0.7*	-1.1	-0.9	-3.0	-2.2*
$11,000 instead of 7,000	-0.9*	-0.8*	-0.5*	-1.0*	-0.8	-2.6	-2.0*
$14,000 instead of 11,000	-0.6*	-0.5	-0.3*	-0.7	-0.5	-1.6	-1.3*
Regression F	8.18	1.90	3.96	2.11	1.45		
Sample size	4413	4045	3337	2156	1089		
	Means and standard deviations of variables used in the regressions						
Divorced (Dummy 1 if yes)	3.51(18.4)	2.27(14.9)	2.10(14.3)	1.72(13.1)	1.74(13.1)	6.81	(25.2)
Age at marriage (Yrs.)	23.9(4.5)	23.6(4.2)	23.1(3.8)	22.6(3.4)	22.0(2.8)	23.2	(4.1)
Schooling (Yrs.)	11.1(3.5)	11.1(3.5)	10.9(3.4)	10.6(3.4)	10.3(3.4)	10.9	(3.4)
Age (Yrs.)	44.8(5.9)	45.1(5.8)	46.2(5.3)	48.3(4.3)	50.9(3.1)	46.1	(5.5)
Earnings ($000)	7.75(4.9)	7.78(4.9)	7.81(5.1)	7.64(5.1)	7.55(5.7)	7.7	(5.0)

*Indicates the coefficient's t-statistic exceeded 2.0. Where the quadratic term in Earnings is not significant, only the effect near the mean is asterisked. Regarding column 7's asterisks, see footnote 51.

and other data, the results in Table 1[42] suggest that the effect of age at marriage and earnings explains 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 consistent 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 $25,000, and become positively related at high levels.[43] Our theoretical analysis implies that a permanent increase in earnings lowers the probability of divorce,[44] and a greater deviation between actual and expected earnings increases the probability (see implication (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 re-estimated the regressions, replacing the variables E and E^2 by variables measuring expected earnings ($\hat{E}$) and the absolute value of unexpected earnings ($|E - \hat{E}|$).[45] The implied effects of different measures of these two variables are shown in Table 2. Expected earnings has the predicted negative effect on dissolutions and unexpected earnings has a smaller but also predicted positive effect, although the results are quite sensitive to the measure used.

Table 2. Implied effects on the probability of divorce in five-year intervals of increases in predicted earnings and in unexpected earnings, SEO white men, aged 35-55. (Estimated from marriage-duration specific OLS regressions which hold Age at Marriage and Age constant.)

	Marriage Interval				
	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years
$4,000 increase in:					
$\hat{E}_1$	-2.87*	-1.42*	-3.22*	-.40	-3.32*
$\lvert E - \hat{E}_1 \rvert$	.56	.20	.68	.44	.20
$\hat{E}_2$	-2.40*	-1.02*	-1.54*	-1.45*	-1.90*
$\lvert E - \hat{E}_2 \rvert$	.40	.06	.40	.04	.15
$\hat{E}_3$	-1.63*	.88	-1.28*	.61	-1.04
$\lvert E - \hat{E}_3 \rvert$	.47	.10	.45	.31	-.01

$\hat{E}_1 = f_1$ (schooling, experience, experience^2, marital status).

$\hat{E}_2 = f_2$ (schooling, experience, experience^2, weeks worked).

$\hat{E}_3 = f_3$ (schooling, experience, experience^2).

$\hat{E}_1$ and $\hat{E}_2$ are computed at age 45, for actual marital status and weeks worked respectively

$\lvert E - \hat{E}_1 \rvert$ and $\lvert E - \hat{E}_2 \rvert$ are computed at actual age, marital status, and weeks worked, respectively.

*indicates the coefficient's t-statistic exceeded 2.0

See footnote 45 for further discussion of expected and unexpected earnings.

A further analysis decomposed unexpected earnings into positive and negative deviations, and unexpectedly high as well as unexpectedly low earnings raise the probability of divorce,[46] 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 three years had a significantly higher probability of divorce over the subsequent five years.

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.[47] Excessive fecundity is also difficult to predict and couples who have children too easily are expected to have higher probabilities of divorce. Our results in the next section also support this implication.

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 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.[48] 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 coefficients of determination in the regressions presented in Tables 1 and 2 are all very low (they are generally under .025 and several are under .01), low R^2's are common and are even to be expected in regressions with dummy dependent variables.[49] What is more important is that many of the estimated regression coefficients are statistically significant even at the .99 level of confidence (the large sample size partly explains this). Instead of relying exclusively on t-values and R^2's, we have tried to determine in a more intuitive way whether the independent variables can discriminate among persons who divorce early, later or never. Three separate probabilities of divorce are predicted using the regression coefficients for each interval and the mean 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 theoretical analysis implies that the probability of dissolution declines with marriage duration (see implications (5) and (7), Section I.6). Table 1 indicates that the proportion of marriages ending by dissolution declines with duration from 3.5 percent in the first four-year interval to 1.7 percent in the fourth and fifth interval. Moreover, most explanatory

Table 3. Conditional predicted probability of divorce, SEO white men, aged 35-55. (Estimated for three groups using marriage-duration specific OLS regressions.)

Probability based on OLS Regression for marriage interval:	Interval-specific probability estimated for men: 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)	Percentage differences (1) - (3) / (3) (4)	(2) - (3) / (3) (5)
0-5 years	4.57%	4.00%	3.43%	33%	17%
5-10 years	2.57	2.50	2.27	13	10
10-15 years	2.79	2.71	2.07	35	31
15-20 years	2.28	2.01	1.69	35	19

(Mean values of regression's explanatory variables used for each group.)

variables in Table 1 do have their strongest effect in the first interval.[50] If we assume, nevertheless, that the explanatory variables had the same effects on the probability of divorce at each duration of marriage, their effects could be estimated by a pooled regression using each five-year interval as a separate observation. Such a regression has been estimated while including dummy variables to capture the differences in level of divorce in each five-year interval.[51] The effects of the explanatory variables implied by this regression are indicated in Column 7 of Table 1. The duration dummy variables (not shown) imply a substantial decline in the probability of divorce between the first two five-year intervals and little change thereafter;[52] this closely mirrors the actual decline in divorce rates, which indicates that the decline with duration is not closely related to changes with duration in our other explanatory variables.

The coefficients in Column 7 of Table 1 estimate the effects of different explanatory variables on the cumulative probability of divorce during the first 25 years when the effects are constrained to be independent of marriage duration. The coefficients in columns 1-5 of Table 1, on the other hand, estimate these effects without constraining them.[53] The cumulative probabilities of divorce during the first 25 years implied by these unconstrained coefficients are shown in column 6 of Table 1.[54] A comparison of column 6 with column 7 indicates that the estimated cumulative impact of age at marriage and earnings (but not age or education) are much larger when the effects are not constrained to be independent of marriage duration.

Women. The following OLS regression was estimated separately for each five-year marriage duration interval for the white women in the SEO survey:

$$D = a_0 + a_1(AM) + a_2(AM)^2 + a_3(S) + a_4(A) + a_5(P) + a_6(C_1) + a_7(C_2)$$

$$+ a_8(C_3) + a_9(C_1 + C_2 + C_3)^2 + u,$$

where D, AM, S and A are the woman's divorce dummy, age at marriage, schooling level and age, defined the same as for the men in the preceding section, and where:

P = 1 if the first birth occurred less than seven months after the date of the marriage;

C_1 = the number of children under age 6 at the beginning of each specific five-year marriage interval;

C_2 = the number of children between the ages of 6 and 17 at the beginning of that interval;

C_3 = the number of children over age 17 at the beginning of that interval.[55]

Unlike the regressions for men, the regressions 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 summarizes these regression results.[56] The effects of age at marriage and education are similar to those found for men in Table 1. For example, a woman's age at marriage also has a negative (and generally stronger) significant non-linear effect on the probability of divorce.[57] Women's schooling, like that of men has a statistically insignificant and quantita-

Table 4. Implied effects on the probability of divorce in five-year intervals, SEO white women, age 35-55, (Estimated from marriage-duration specific OLS regressions.)

	Marriage interval				
	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years
Age at marriage:					
Marry at 20 instead of 15:	-4.2*	-3.3*	-3.6*	-3.3*	-2.4
Marry at 25 instead of 20:	-2.4*	-2.2*	-1.6*	-1.3*	-0.4
Marry at 30 instead of 25:	-0.4*	-1.0*	+0.4*	+0.7*	+1.5
Marry at 35 instead of 30:	+1.4*	+0.1*	+2.4*	+2.7*	+3.5
Schooling: 4 additional years:	-0.4	+0.1	+0.3	-0.2	+0.2
Age: 10 years younger in 1967:	+0.4	+0.6	+0.1	0.0	-1.1
Premarital conception:	+1.2	+3.4*	+1.0	+0.9	-2.0
Presence of an additional child:					
Age 0-6:	-1.1*	-1.4*	-1.2*	-1.1*	+1.2
Age 6-17:			+0.1*	-0.3*	-0.2
Age 17+:	---	---	---	---	+0.6
Regression F	12.63	10.09	6.85	5.23	1.83
Sample size	5509	5184	4588	3235	1871

Means and standard deviations of variables used in the regression

	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years
Probability of divorce	4.12(19.9)	3.92(19.4)	3.55(18.5)	2.35(15.2)	1.98(13.9)
Age married	21.0(4.4)	20.9(4.1)	20.5(3.8)	20.1(3.6)	19.6(3.2)
Schooling	11.0(2.8)	11.0(2.8)	11.0(2.8)	10.7(2.8)	10.4(2.9)
Age	44.5(5.9)	44.6(5.9)	45.1(5.7)	47.1(4.9)	49.6(3.6)
Premarital conception	0.058(0.2)	0.058(0.2)	0.057(0.2)	0.055(0.2)	0.054(0.2)
Children < 6	0.371(0.5)	1.31(0.9)	1.07(1.0)	0.57(0.8)	0.089(0.3)
Children 6-17	-----	-----	1.09(0.8)	1.97(1.2)	0.90(1.1)
Children 17+	-----	-----	-----	-----	1.80(1.2)
$(\text{Children})^2$	-----	2.61(3.2)	6.49(7.2)	9.13(10.7)	11.28(14.2)

*indicates the coefficient's t-statistic exceeded 2.0. The effects of children are evaluated at the variable's mean value.

tively small effect that varies in sign.

A premarital conception has a large effect on the probability of divorce in the first four intervals, although it is statistically significant only in the second interval. (We have no explanation for the negative sign in the fifth interval.) We argued that an accidental premarital conception would increase the probability of dissolution because it would raise the cost of finding a suitable mate (see Section I.3 and implication (6) in section I.6).[58]

The number of children under age six has a large and usually statistically significant effect on the probability of divorce. A child by the 15th month of a marriage lowers the probability of divorce within the first five years of marriage by one percentage point, or by about 25 percent of the mean (even holding constant the premarital pregnancy variable). The effect of young children on the probability of divorce in the second and third intervals is non-linear: for example, the first child under age six at the fifth year of the marriage lowers the probability of divorce in the next five years by about 2.1 percentage points; a second child further lowers it by 1.2 percentage points; third and fourth children have small marginal effects, -0.3 percent and +0.7 percent respectively, while a fifth child appears to raise the probability by 1.6 percentage points! The positive effect of a relatively large number of children appears to support our theoretical prediction that a greater deviation between 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 (+0.1 and -0.3 compared to -1.2 and

-1.1 in the third and fourth intervals respectively). 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 because younger children embody more marital-specific capital.[59]

Indeed, even the positive effect of children over age 17 observed in the fifth interval is consistent with the theory. Parents sometimes postpone dissolution until their children are older and the specific capital embodied in them reduced. This interpretation has the implication that the positive effect observed for older children would be largest when there were no younger children. In regressions that introduce interaction terms between C_1, C_2, and C_3, the effect of C_3 is largest when $C_1 = C_2 = 0$.

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. Some have argued that childless couples have higher divorce rates,[60] but the evidence to date is very imperfect, consisting of such aggregate statistics as the percent of divorces involving no children, or the average number of children involved in divorce.[61] With much more detailed evidence, we find large effects of children, although these effects are not linear with respect to either number or age:[62] younger children discourage divorce more than older children do and the first two children discourage divorce more than additional children do.

II.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 married outside his or her religion. Differences in education and in age also appear to increase the probability of dissolution.[63]

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[64] does provide such information and Michael (1976) has 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 her spouse had the same religion. Results for women reported in Table 5 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 four 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 divorces obtained within the first 24 years of marriage.

We showed in the theoretical section that the traits of mates differ more from what they would be in the "optimal" sorting when their marital search costs are larger (see Section I.3). We also showed 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 results in Table 5 for the Terman women on religious

Table 5: OLS regression estimates of the probability of divorce by 1940 and by 1960 for women first married 1-4 years prior to 1940 (Terman sample).

Explanatory variable	Probability of divorce	
	By 1940	By 1960
School, Wife	.009 (0.83)*	.041 (2.02)
School, Husband	.005 (0.69)	-.028 (-1.97)
Age Married	-.013 (-1.65)	-.041 (-2.74)
Both Catholic	-.241 (-2.03)	-.387 (-1.76)
Both Jewish	-.225 (-1.94)	.029 (0.13)
Both Protestant	-.245 (-5.09)	-.252 (-2.82)
Both No Religion	-.251 (-4.13)	-.158 (-1.41)
Both Other Religion	-.275 (-2.82)	-.268 (-1.49)
Constant	.346	1.132
Adjusted R^2	.17	.10
F	3.73	2.49
Sample size	114	114

*t values in parentheses.

Source: Michael (1976, p. 28)

differences and the related results mentioned above are all consistent with this implication.[65]

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.[66] There is also evidence that persons who marry relatively young are more likely to intermarry than are persons who marry at average ages. Our theoretical analysis implies that persons marrying at young ages have less information about themselves and the marriage market (see Section I.3). Hence their high dissolution and intermarriage rates are related: both are reflections of their limited information.[68] This evidence on intermarriage supports our interpretation of the relation between dissolution and age at marriage.[69]

Perhaps the most telling 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 in 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 6. 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 marriages, but is also considerably higher than the fraction of persons who intermarried after dissolving a marriage with someone

Table 6: 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 2nd Marriage	Married Outside Own Religion On 2nd Marriage
		WOMEN			
Married someone of same religion	.88	.81	.44	.40	.50
Married someone of different religion	.12	.19	.56	.60	.50
Number 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
Number of Observations	689	38	18	4	3

from the same religion. Since our theory implies that persons who divorce tend to have higher search costs, they should have a relatively high rate of intermarriage in later marriages. The data in Table 6 are consistent with this implication.

There is evidence that previously divorced Jews intermarry more frequently than Jews marrying for the first time.[70] Moreover, the Rosenthal (1970) 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!

We argued earlier that intermarriage is higher among Jews living in communities with relatively few Jews 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 raises 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 one 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.

Unfortunately, information on the IQ's of the Terman subject's spouses is quite limited, but available evidence is consistent with our expectation. 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). A regression of the

spouse's score on the subject's score has a standard error exceeding 1/3 of the score of the spouses.[71] It is not surprising to find, therefore, that Terman subjects have had high divorce rates: 27 percent of Terman women had been divorced from their first husbands by 1972.[72]

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,[73] an implication supported by considerable evidence. For example, Ross and Sawhill (1975, p. 56) find that each $1,000 increase in the earnings of wives, holding constant the earnings of their husbands and other variables, increases the probability of divorce in the subsequent five years by about 1 percentage point. The evidence on Terman subjects' divorces by 1960 in Table 5 is also relevant, for the schooling coefficient of Terman women is significantly positive, and that of their husbands significantly negative, and schooling and wage rates (not included in the regression) are positively correlated.[74]

Interesting additional evidence comes from the effects of welfare payments on dissolutions.[75] 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 SMSA's is strongly related to the size of welfare payments. (More generally, any system of transfers in which payments mainly depend on a household's total income -- be it welfare, negative income tax, or aid

to families with dependent children -- encourages marital dissolutions because it compensates for the reduction in resources available to the spouses as a consequence of dissolution.)[76]

II.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 expected 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 this argument implies that a negative correlation between number of children and the probability of dissolution might reflect, instead, causation from a higher probability to fewer children.

Usually, the relative importance of different directions of causation is determined by estimating a simultaneous equation model that includes coefficients reflecting each direction. Such a model could be constructed to identify the causation between children and dissolution, but we decided against this strategy since the SEO survey contains no information on the first spouses of persons who dissolved their first marriages, while the Terman survey contains only limited relevant information, and neither survey contains information on any other kind of marital-specific capital. Instead, we have attempted to study the causation from the probability of dissolution to the demand for children by constructing a situation (by sample selection) which 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 they would not fully compensate

later for reduced investment earlier. Building on this argument, we relate the number of children of intact couples to several determinants of their probability of dissolution, and to (other) determinants of their demand for children. We have restricted the analysis to couples who have essentially completed their child-bearing in order to circumvent the sizeable random and other transitory determinants of the timing of births.

From the SEO sample, white women age 40-55 with first marriage intact were selected. The number of children ever born 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.[77] 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. This regression is reported in Table 7. The education cross-product does have a powerful positive coefficient. Race also has a significant positive effect: racially mixed couples tend to have one child fewer than other couples with the same other measured characteristics. The coefficient for the age cross-product is counter to our prediction, but its statistical significance is slight.[78]

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.[79] The interaction between IQ's

Table 7: Regression on number of children of women with intact first marriages: SEO white women, ages 40-55.

Variable:	Coefficient (t-value)
Age Husband	0.055 (0.98)
Age of Wife	0.074 (1.23)
Education of Husband	-0.200 (-7.14)
Education of Wife	-0.19 (-7.04)
Wage of Husband	-0.006 (-1.05)
Age Married, Wife	-0.100 (-2.38)
(Age Married, Wife)^2	-0.0001 (-0.15)
Race (= 0 if different)	1.00 (1.90)
Age Cross-Product	-0.0016 (-1.33)
Education Cross-Product	0.016 (6.96)
Constant	4.81
$\bar{R}^2$	0.10
F	36.76
N	3262

also appears to affect fertility (see Garrison-Anderson-Reed [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 IQ's 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) and Ben-Porath (1974) argue 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 (discussed above) and religion (discussed below) also reduce fertility.

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 sizeable effect: the number of children is reduced by about .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 showed 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 strong evidence of causation running from the probability of dissolution to the demand for children: a higher probability reduces the demand. There is a little evidence also that the demand for other kinds of marital-specific capital is reduced as well.[80] 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.

II.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 30 percent of the SEO men and 23 percent of the women remarried within two years of their divorce, and only 48 and 43 percent, respectively, remarried within five years.[81]

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 of remarriage of divorced men and women in the SEO survey was related to several measures of the expected gain. The calculations in Table 8 were derived from OLS regressions in which the dependent variable is a dummy equal to one if the person had remarried by the nth year after the termination of their first marriage (n = 2, 5, 10, and 15 in the four regressions used in Table 8).[82]

Higher earnings for men significantly increase the probability of remarriage at all four durations.[83] 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 1) 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

Table 8. Implied effects on the cumulative probability of remarriage in specified intervals; SEO white men and women aged 50-65 (estimated from OLS regressions[a])

A: MALES

	2 years	5 years	10 years	15 years
Age at divorce:				
age 35 instead of 30:	0.3%	1.8%	6.3%	-8.9%
age 40 instead of 35:	-1.5	-3.4	-6.8	-12.9
age 45 instead of 40:	-3.3	-5.1	-7.2	-16.9
Schooling: four additional years:	3.2	4.0	-1.8	-3.2
Earnings: $4000 additional:	4.8*	6.4*	8.4*	8.4*
Duration of first marriage: lasted five years longer:	5.1*	5.6*	4.4	4.7
Age: 10 years younger in 1967	2.8	0.8	-1.6	-1.2
Widowed in first marriage	-8.2	-3.3	-7.8	-9.8
Regression F	3.02	2.39	2.78	3.80
Sample size	354	310	261	216
Means and standard deviations of variables used in the regressions:				
Age divorced (AD)	40.0 (10.7)	37.9 (9.6)	35.3 (8.0)	33.3 (7.0)
Schooling (S)	9.9 (3.4)	9.9 (3.4)	9.9 (3.3)	9.9 (3.2)
Duration of first marriage (Dur)	15.4 (10.5)	13.5 (9.3)	11.3 (7.4)	9.8 (6.5)
Age (A)	57.9 (4.7)	57.9 (4.7)	57.8 (4.6)	58.0 (4.7)
Earnings (E)	5,762. (4,478)	5,827. (4,584)	5,821. (4,697)	5,732. (4,410)
Widowed (dummy = 1 if widowed) (W)	0.38 (0.49)	0.34 (0.48)	0.28 (0.45)	0.25 (0.43)
Remarried (dummy = 1 if remarried) (Pd)	0.29 (0.45)	0.47 (0.50)	0.64 (0.48)	0.76 (0.43)

[a]The regression is:

$$Pd = a + b_1(AD) + b_2(AD)^2 + b_3S + b_4E + b_5Dur + b_6A + b_7W + u.$$

*Indicates the coefficient's t-statistic exceeded 2.0.

Table 8 (concluded)

B: FEMALES

	2 years	5 years	10 years	15 years
Age at divorce:				
age 35 instead of 30:	-1.5%	-5.0%	-7.3%*	-7.7%
age 40 instead of 35:	-2.3*	-6.4*	-11.2*	-11.0*
age 45 instead of 40:	-3.2	-7.9	-15.0*	-14.4
Schooling: four additional years:	-1.4	-1.0	-0.7	-3.2
Children:				
One child	-9.0*	-33.7	-35.3	-26.9
Each additional child:	-1.4*	-1.3	-2.9	-0.5
Duration of first marriage lasted five years longer:	2.4*	3.7*	5.6*	4.4
Age: 10 years younger in 1967:	6.8*	2.8	0.8	9.5
Widowed in first marriage	-12.0*	-9.3	-10.0*	-14.0*
Regression F	11.21	14.71	13.13	9.71
Sample size	991	861	684	536
Means and standard deviations of variables used in the regressions:				
Age divorced (AD)	40.5 (11.7)	38.3 (10.8)	35.0 (9.3)	32.0 (8.0)
Schooling (s)	9.9 (3.3)	9.9 (3.2)	9.8 (3.3)	9.8 (3.2)
Children from first marriage (C)	1.9 (1.9)	1.8 (1.9)	1.8 (1.8)	1.7 (1.8)
Duration of first marriage (Dur)	19.4 (11.4)	17.3 (10.4)	14.6 (9.1)	12.0 (7.6)
Age (A)	57.9 (4.6)	57.9 (4.6)	57.8 (4.6)	57.8 (4.6)
No children (dummy = 1 if no children) (NC)	.046 (0.21)	.053 (0.23)	.067 (0.25)	.084 (0.28)
Widowed (dummy - 1 if widowed) (W)	.632 (0.48)	.592 (0.49)	.525 (0.50)	.466 (0.50)
Remarried (dummy = 1 if remarried) (Pd)	.124 (0.33)	.294 (0.46)	.474 (0.50)	.621 (0.49)

[a] $Pd = a + b_1 AD + b_2 AD^2 + b_3 S + b_4 C + b_5 Dur + b_6 A + b_7 NC + b_8 W + u.$

*Indicates the coefficient's t-statistic exceeded 2.0

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,[84] and should be positively related to the probability of marriage. Table 8 strongly confirms this: the probability of remarriage is raised by about five percentage points for men and somewhat less for women when the first marriage lasts five years longer.

Education has a small positive, but statistically insignificant effect on the probability of remarriage for men, and an even weaker negative effect on that for women.[85] These results are consistent with the weak effect of education on the probability of divorce (see Tables 1 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).

An increase in age at divorce reduces the probability of remarriage for both men and women with this distinction: the coefficients are all negative in the regressions for women, and many are sizeable and statistically significant, while none of the coefficients for men are statistically significant, and some are positive. The more pronounced negative effect for women is presumably partly related to the closer connection for women between age and child-bearing capacity, and partly to the steep decline with age in the ratio of unmarried men to women.[86]

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.

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.[88] 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 8 after simply subtracting two years from the date of divorce, although the separated time of most divorced persons may well exceed two years.[89] 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.[90]

An explicit estimate of the effect of separation can be derived from the 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 9 indicate that widows do remarry more quickly than divorced persons -- the coefficient for men is statistically significant[91] -- when the length of separation and other variables are held constant. Moreover, as we expected, persons do appear to use their time while separated to search for another mate: both men and women remarried 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 (Panel B of Table 8), and increase the time it takes to remarry for those who do (Table 9). The evidence in Table 8 suggests that the number of children is 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) in Section I.6). 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 9 indeed shows that whereas children significantly raise the duration of time to remarriage of Terman women, they have no such effect on the Terman men.[93]

One immediate implication of this evidence on the effects of children is that divorced men are more likely to remarry partly, perhaps even mostly,[94] 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 remarriage intervals with a probability predicted for women with no children.[95] The results are quite instructive. The actual frequencies of remarriage two years after the end of the first marriage are 31 percent for SEO men and 22 percent for SEO women. The predicted frequency for women with no children is 42 percent, considerably above the actual probability for men![96]

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

Table 9. 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. (t values in parenthesis)

Variable	Women	Men
Age at termination of first marriage	-0.21 (-1.17)	-0.03 (-0.38)
Number of children, first marriage	1.02 (2.13)	-0.19 (-0.70)
Duration of first marriage (yrs.)	0.10 (0.45)	-0.43 (-2.64)
Length of separation in first marriage (in six month intervals)	-0.45 (1.10)	-0.20 (-1.47)
Widowed	-1.33 (-0.69)	-2.90 (-2.29)
Constant	8.13	6.07
$\bar{R}^2$	0.13	0.17
F	1.96	3.58
Sample size	42	72

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.

II.5 Stability of Second and Higher-Order Marriages

We have pointed out that 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, et cetera. Using divorce and marriage records from the state of Iowa, Monahan (1958, 1959) finds that the probability of divorce increases sharply with the order of marriage for persons previously divorced[97] but not for persons previously widowed.

Since these data and most others used in studying second and third marriages are not standardized for age at marriage, age, or even duration married, the higher probability of divorce in higher-order marriages might be easily explained primarily by the increase in age at marriage or the decline in the average duration married as the order of the marriage increased.[98] A major advantage of the SEO data is that different order marriages can be compared after standardization for age, age at marriage, duration married, and other variables. However, few persons divorced more than once even in the large SEO survey, so the evidence on second and third marriage divorces is based on quite small samples.

Regressions on the probability of divorce are run with the SEO data, including higher order as well as first marriages. These regressions duplicate those shown in Table 1 for men and Table 4 for women, except 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.[99] 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 10 gives the coefficients on these two dummy variables only, taken from the full multiple regression equation.[100]

The main findings of Monahan and others apparently continue to hold even after the standardizations introduced in these regressions. For women, second marriages are much more unstable than first marriages, especially during the first five years of marriage: the probability of divorce is about 14 percentage points higher on the second than on the first marriage. Moreover, aside from the first five-year interval, the probability of divorce for widows is no greater than for women in their first marriage.

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 8) women who were widowed the first time and had remarried. Only 12 women were married a third time. Forty percent (4) of those (10) who had been divorced from both previous marriages were divorced again, whereas neither of the two previously widowed women were divorced from their marriage.

The results for men in Table 10 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. Indeed, aside from the initial interval,

Table 10. 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).

Explanatory variable	Women				Men			
	Marriage interval (in years)				Marriage interval (in years)			
	0-5	5-10	10-15	15-20	0-5	5-10	10-15	15-20
Dummy = 1 if second or third marriage**	.138 (15.94)*	.012 (1.36)	-.002 (.18)	.026 (2.60)	.036 (4.13)	.013 (1.68)	.016 (1.78)	.017 (1.60)
Dummy = 1 if widowed in first marriage	.002 (.13)	-.018 (1.19)	-.027 (1.55)	-.022 (1.18)	-.009 (.47)	-.009 (.51)	-.016 (.77)	-.027 (1.25)
R^2 (entire regression)	.037	.010	.009	.005	.011	.001	.004	.003
F (entire regression)	56.82	12.23	7.56	3.15	12.08	0.80	2.71	1.60
N	11960	9627	7683	5736	8688	6948	5500	4026

* t values in parenthesis

** second or third marriage for men; second marriage for women

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.

the probability of divorce is no greater for widowers than for men in their first marriage.[102]

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

Consider now the duration to divorce. By extension of the previous argument, 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. Hence the average duration to divorce of those terminating their marriage should decline with marriage order (because less time is required to accumulate sufficient adverse information when the expected gain is smaller). This can explain Monahan's evidence of a significant decline with marriage order in the average duration to divorce for persons previously divorced[103] 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 8 and 9), and the evidence in Table 10 that the probability of divorce on second and third marriages is especially high during the first few years of marriage.

When the SEO data are not standardized for age and age at marriage (Monahan's data were not standardized for these variables), they also indicate that among those who divorce, the length of time from marriage to divorce declines significantly from first marriage to second marriage. However, when the data are standardized for age and age at current marriage, the average

duration is no longer related to marital order.[104] Consequently, when appropriately standardized, the SEO data do not support our prediction that duration-to-divorce will decline in higher-order marriages.

We also ran regressions (not shown) 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 1 and 4). Since few persons had divorced from a second marriage (for example, only 13 men divorced within the first five years of their second marriage), the statistical significance of most coefficients is quite low. Yet, the results 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. An increase in education has weak and inconsistent effects on the propensity to divorce; as in the results for first marriages, the effect is slightly positive for women.

An interesting new result for women is shown in Table 11: children from a prior marriage appear to increase the probability of dissolution from the current marriage,[105] whereas children from the current marriage appear to decrease this probability in second marriages, just as it does 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

Table 11. OLS regressions on the probability of divorce for women in second marriages, by marriage interval (SEO white women age 15-65).

Explanatory variables	Marriage interval (in years) 0-5	5-10	10-15
C_1 **	-1.39	-.93	.12
C_2			-3.18
P	3.91 (2.14)*	5.01 (2.42)	-.70 (0.34)
Children from 1st marriage	.44 (.92)	.83 (1.62)	.52 (.92)
$\bar{R}^2$	.030	.027	.030
F	3.93	2.30	1.56
N	1032	752	508

* t values in parenthesis

** Effects of children are evaluated at the mean number of children.

Other variables included were age, age at marriage and its square, education, and a dummy variable indicating whether the women had been widowed or divorced from their first marriage.

evidence of causation from marital stability to children: there are fewer children in higher order marriages in the SEO survey, even after age at current marriage and duration of current marriage are held constant.[106] 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.

II.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 (see Rheinstein, 1972, p. 31), whereas in the past year or so there have been approximately 1 million divorces a year in the U.S. Based on 1973 data it is estimated that about 40 percent of new marriages in the U.S. will end in divorce (see Preston, 1974). The reported divorce rate in the U.S. (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 around both World Wars (the historic peak until the last few years had been 1946 with a divorce rate of 17.9) (see Plateris, 1973, p. 24). Since the mid-1960's the divorce rate increase has accelerated; by 1970 the rate was 14.9 and by 1974, 19.3.[107] 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.[108]

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 (see implication (5) in Section I.6); the survey evidence above has confirmed that both directions of causation are important (see especially Tables 4, 7, 8, 9, and 11). 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 1950's, at least five 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 (see the evidence in Section II.3). 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 (see Section II.4).

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,[109] 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 (not negatively) correlated across states, even after age and many other variables are held constant (see Freiden, 1974, and Santos, 1975).

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 8 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.[110] Moreover, the sharp acceleration in divorce rates that began in the 1960's may have been partly caused by the prior growth in divorce rates, for if the process can be described by a logistic or related function, the rate of growth would accelerate for a while after the level became sufficiently high.

Even though an increase in male earnings or age at marriage significantly reduces the probability of divorce when comparing different households at the same period in time (see Section II.1), 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 (see Section I.2). 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 a related argument 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.

Tables 1 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.[111] 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 (1920's to early 1960's). 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, as we already mentioned, 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.[112] 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.

Summary and Conclusions

The theory developed in Part I of this paper assumes that each person maximizes his or her expected utility as he decides whether to marry or to remain married. The relatively high utility expected when marrying is reconciled with the relatively low utility expected when divorcing by introducing imperfect information and deviations between realized and expected outcomes.

The probability of dissolution is greater when the expected gain from marriage is smaller and the variance in the distribution of realized outcomes is larger. Both the expected gain and variance depend on the cost of acquiring additional information about potential mates in the marriage market. The

expected gain will decline as the cost increases because a person facing a higher cost is induced to accept a less-favorable marriage offer, i.e., a mate with characteristics that are further away from the optimal characteristics in the equilibrium-sorting with perfect information. The variance will increase as the cost increases because a person facing a higher cost is induced to accept a mate about which he or she has less information.

The expected gain from marriage also depends systematically on the level of different characteristics. For example, an increase in the intelligence or attractiveness of men or women or the earnings of men tends to raise the gain, whereas an increase in the earnings of women tends to lower the gain.

The accumulation of certain kinds of knowledge and capital such as sexual compatibility or children, that normally occurs with an increase in the duration of a marriage, increases the expected gain from remaining married because such marital-specific capital has less value if the marriage dissolves. Conversely, a reduction in the expected gain from remaining married discourages the accumulation of marital-specific capital.

The probability and speed of remarriage are positively related to the expected gain from remarriage, which depends on earnings, age, number of children from the previous marriage, and other characteristics. Divorced, but not widowed, persons marrying for a second or third time are more likely to dissolve their marriages, and tend to dissolve faster, than persons marrying for the first time. The reason that they become divorced is partly because they tend to gain relatively little from marriage, and partly because becoming divorced in itself raises the probability of an additional divorce.

Many of the more important theoretical implications are listed in Section I.6. The empirical analysis using the 1967 SEO and 1920-1960 Terman data strongly supports these implications and is also of considerable interest in its own right.

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. This evidence confirms theoretical implication (1) in Section I.6).

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. There is a bit of evidence that couples often delay their dissolution until their children are grown (and embody less marital-specific capital). 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 (See implication (5) in Section I.6).

If a person marries outside of his religion, he is much more likely to dissolve his 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, also appears to be directly related to the relative number of potential mates of the same religion that are available. This and considerable other evidence on intermarriage is implied by our theoretical analysis (see implication (6) in Section I.6).

An increase in the probability of dissolution, as measured empirically by the propensity to marry outside of one's religion, race, or education class, reduces the demand for children (see Table 7) and for other marital-specific capital, such as skills highly specialized to the nonmarket sector (see implication (5), Section I.6). Therefore, the observed negative relation between the propensity to dissolve and children (and some other kinds of marital specific capital) involves causation running in both directions.

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 -- also have relatively high probabilities of dissolution (see implication (4) in Section I.6).

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 of the prior marriage, the length of time separated before legal termination, and some other variables (see implication (8) in Section I.6).

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 (see implication (9) in Section I.6). Although our theory also predicts that the duration to divorce declines with marital order for persons previously divorced, the empirical evidence is rather ambiguous.

Most of our empirical evidence involved different households at a moment in time. Yet our limited examination of evidence on trends in divorce rates suggests that our theory can also contribute significantly to understanding and explaining the secular growth in divorce, including the acceleration since the early 1960's. The most important variables appear to be the decline over time in number of children, the growth in labor force participation and earning 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 and the growth in public transfer payments.

In many ways, marriage and divorce is a special case of a "contract" of indefinite duration between two or more partners, such as business partners or employees and their employer, that can be terminated under specific conditions. A theoretical and empirical analysis of divorce is important not only because the decision to divorce has significant effects on subsequent behavior and well-being, but also indirectly because the evidence on divorce is far more extensive and detailed than the evidence on the termination of jobs, business partnerships, or other contracts.

We believe that our analysis of divorce further reveals the power of "the economic approach" to clarify and illuminate demographic behavior. It is, therefore, an additional contribution to the development of what has recently been called "sociological economics": the application of economic concepts and analysis to behavior at least partly outside the monetary sector.

Becker, Landes, Michael: FOOTNOTES

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.
2. See Section II.6 for details (especially footnote 107).
3. "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 leisture" (Cabell). (These references are taken from Evans [1968]).
4. The solution can be formally developed with dynamic programming. Expected income in the last (nth) period is maximized, given the realizations at the end of the n-1st period by

$$\hat{I}_n = \text{Max } EI_n(M_n;\ R_{n-1},\ u_n),$$

where R_{n-1} represents the realizations at the end of n-1, and the distribution of income in n partly depends on the marital decision (M_n) made then and the random variable (u_n) realized in n. Similarly, expected wealth in n-1 is maximized by

$$W_{n-1} = \text{Max } E[I_{n-1}(M_{n-1};\ R_{n-2},\ u_{n-1}) + \frac{\hat{I}_n}{1+r}]$$

$$= \text{Max } E[I_{n-1}(M_{n-1};\ R_{n-2}, u_{n-1}) + \frac{\text{Max } EI_n(M_n;\ R_{n-2},\ M_{n-1},\ u_{n-1},\ u_n)}{1+r}]$$

where u_{n-1} is realized in n-1. This process of maximizing expected wealth, contingent on the realizations of random variables in the past, can be continued backwards for all n periods.
5. During the 1950's and 60's the median duration of marriage prior to divorce ranged between 5.8 years and 7.5 years in the U.S. (Plateris 1973b, p. 39; and Plateris, 1973a, p. 49). Regarding the percent distribution of divorces by marriage duration from 1870 to 1967, see Plateris (1973b, p. 41).

6. See Plateris (1973b, p. 19). Of course, a divorce might not be sought if strong opposition were expected.

7. These implications are supported by evidence in Bartel (1975). Hashimoto (1975) applies a model of combined maximization to the Seattle labor market, with some empirical confirmation.

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

9. We say "relatively" high earnings because we are considering only a change in the earnings of some men relative to those of other men. A change in the earnings of all men would have a weaker effect on the gain from marriage than an equal change in relative earnings if characteristics of women did not change much. We consider these differences more systematically in our discussion of changes in marital dissolutions over time (see Section II.6).

10. Search theory was first applied to the marriage market by Keeley (1974).

11. For more extensive discussion of this framework, see Wessels (1976).

12. Take a point A_i to the right of A_ℓ where

$$I^i > \alpha^i G^i + I_{mo} - c = V^i .$$

Then by substituting for I^ℓ from the equation in the text, we have

$$I^i > I^\ell + (\alpha^i G^i - \alpha^\ell G^\ell).$$

Clearly, I^i must exceed I^ℓ, for if I^i were less than I^ℓ, then $\alpha^i G^i$ would exceed $\alpha^\ell G^\ell$ from a basic property of the distribution of offers, and the inequality could not hold.

13. If A_{m_i} were not the upper bound of A_{ℓ_i},

$$I^{\ell_i}_{m_i \ell_i} > V^{\ell_i}_{m_i \ell_i}, \qquad (1')$$

where $I^{\ell_i}_{m_i \ell_i}$ is the income to a woman with the trait A_{ℓ_i} from a match with A_{m_i}. Since A_{ℓ_i} is the lower bound of A_{m_i}, then

$$I^{\ell_i - \Delta}_{m_i \ell_i - \Delta} < V^{\ell_i - \Delta}_{m_i \ell_i - \Delta}, \qquad (2')$$

where $\ell_i - \Delta$ refers to a woman with a trait slightly lower than A_{ℓ_i}. Continuity of the income and value of search functions implies that inequality (2') could not hold for traits arbitrarily close to A_{ℓ_i}, the lower bound of A_{m_i}, if inequality (1') held. Hence A_{m_i} has to be the upper bound of A_{ℓ_i}.

14. 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.

15. 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 co-educational universities that require considerable intelligence for admission.

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

17. The effect of differences in search efficiency are less clearcut. 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.

18. If offers were uniformly distributed, the expected income gain from marriage would equal

$$H = \frac{I^{mx} + I^{a}}{2} - I_{o},$$

where I_o is single income, I^a is the minimum acceptable, and I^{mx} is the maximum possible income offer. Since it can be shown that $dI^a < dI_o$, an increase in single income, with the distribution of offers held constant, would reduce the expected gain, for

$$\frac{dH}{dI_o} = \frac{1}{2}\frac{dI^a}{dI_o} - 1 < 0 \text{ as long as } dI^a < 2dI_o.$$

If offers were not uniformly distributed, the magnitude of dH/dI_o would change, but it would still tend to be negative.

19. Let the probability of dissolution be determined by

$$p = f(K, y), \qquad (1')$$

with

$$\frac{\partial f}{\partial K} < 0, \text{ and } \frac{\partial f}{\partial y} > 0,$$

where K is the stock of specific capital, and y are the other variables that affect dissolution. Also let the stock of specific capital be determined by

$$K = h(p, x), \qquad (2')$$

with

$$\frac{\partial h}{\partial p} < 0, \text{ and } \frac{\partial h}{\partial x} > 0,$$

where x are other variables that affect this capital. Then if y changes with x held constant,

$$\frac{dp}{dy} = \frac{\partial f}{\partial y} + \frac{\partial f}{\partial K}\frac{\partial h}{\partial p}\frac{dp}{dy},$$

or

$$\frac{dp}{dy} = \frac{\frac{\partial f}{\partial y}}{1 - \frac{\partial f}{\partial K}\frac{\partial h}{\partial p}} \quad . \qquad (3')$$

Therefore,

$$\frac{dp}{dy} > \frac{\partial f}{\partial y} \text{ since } \frac{\partial f}{\partial K} \text{ and } \frac{\partial h}{\partial p} < 0.$$

Similarly, it can be shown that

$$\frac{dK}{dx} > \frac{\partial h}{\partial x} \quad .$$

20. Calculated from 1967 SEO data.

21. See, for example, the study by Kogut (1972) of the incidence and stability of consensual unions in Brazil.

22. 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 -- and to the "offer" from being single.

23. We distinguish between these effects in the empirical section.

24. Perhaps more persuasive evidence is that a significant fraction of persons remarry shortly after their first marriage dissolves (see the empirical evidence in Table 8).

25. Most widowed persons are considerably older and form a somewhat distinct market.

26. We present some results in Section II.4 on the effects of children on remarriage.

27. Our earlier analysis shows that persons with lower expected gains from marriage, such as men with low earnings and women with high earnings, or persons who married out of their race or religion, have lower minimum

acceptable offers. Moreover, there is evidence that they are in fact less likely to marry (see Section II.4).

28. An analysis that rules out remarriage is much less applicable when the minimum acceptable offer in the remarriage market greatly exceeds non-married wealth. Our predictions about the relation between dissolution rates and variables like search costs then become more ambiguous.

29. This difference in the average expected gain on first and second marriages is reduced but not eliminated by the negative relation between the propensity to remarry and the expected gain from remarriage (see footnote 27).

30. There is little reason to expect persons who were widowed the first time to have a relatively high dissolution rate on their second marriage; see the empirical evidence in Section II.5.

31. 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."

32. 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." Usually differences in behavior between "stayers" and "movers" have been simply taken as given and described (see, for example, Heckman-Willis 1975). Our analysis probes into the underlying causes, and explains such differences in behavior in marital and other markets by differences in more basic characteristics, such as search costs, specific capital, properties of optimal sortings, and even luck.

33. Glick and Norton (1971, p. 308) discuss the strengths and weaknesses of the SEO data for the study of marital behavior. The weaknesses mentioned include the discrepancy between SEO and CPS figures -- the SEO shows a higher proportion of adults currently divorced and a lower proportion married. They suggest that the larger number of divorced in the SEO "may be closer to the true numbers than those in the CPS." Even so, according to Glick and Norton, the divorces reported for 1960-66 fall 10 to 20 percent below the numbers reported to vital statistics. The accuracy of the marital histories presented by the SEO data is, of course, also subject to some reservation, but the inaccuracies may not be systematically related to the variables analyzed here.

34. All persons whose marriage ended by death of a spouse were excluded.

35. For women with more than four children ever born, the birth dates for children other than the first two and last two were interpolated at equal intervals between the second and next-to-last child.

36. We have also used the maximum likelihood logit approach, and the coefficients estimated are quite similar to the OLS estimates, even though the mean of the dichotomous dependent marital variable is near zero. Since the OLS and logit estimates are so similar, only OLS results are reported.

37. The OLS regressions are shown in the Appendix. Since the number of observations at later marital durations declines even more rapidly when younger men are included in the study primarily because younger men have not been exposed to longer durations, we have restricted most of the analysis to persons in the 35-55 age group. Even here, the number of observations declines about 25 percent from the first to the third interval

and much more rapidly after that. To test whether the decline in sample size significantly affects the results, we have also run regressions for men 45-55 years old, and the results are generally quite similar to those reported in Table 1, except that the coefficients of earnings and earnings squared have less statistical significance. The significance is lower partly because actual earnings at ages 45-54 are a poorer measure of lifetime earnings than are actual earnings at ages 35-44.

38. These differences also imply that the average date of marriage was earlier at later durations: the implied average date of marriage was 1946 [= 1967 - (44.7 - 23.9)], 1945, 1944, 1941, and 1938 in the first through fifth intervals respectively.

39. The age at marriage with the minimum probability of divorce implied by the regression coefficients ranged from 27.1 to 31.7 in the first four intervals. The fifth interval has no implied minimum.

40. See, e.g., U.S. Census (1972a), or Carter and Glick (1970), especially pp. 234-35. Ross and Sawhill (1975, p. 56) and Bumpass and Sweet (1972) also find statistically and qualitatively significant effects of age at marriage. Ross and Sawhill's linear coefficient implies that a delay in age at marriage, cet. par., reduces the probability of divorce over a four-year period by two percentage points (the average probability in the sample is 7.6%).

41. The upturn at older ages is in evidence for all marriage cohorts since 1920. See U.S. Census (1973) Table 4. The upturn is also evident for 1960 data in Carter and Glick (1970, p. 234).

42. In an often cited study of 1960 Census data, Cutright (1971, p. 293) also finds no appreciable effect of male's education on the stability of first marriages when male's earnings are held constant.

43. The OLS regression estimates imply a positive effect of earnings on the probability of divorce above earnings of about $33,300, $52,500, $25,000, $48,400, and $46,300 in each of the five duration intervals respectively.

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

45. The log of earning of each man in the SEO survey was regressed on his years of schooling, experience (defined as age minus years of schooling minus 6), experience squared, and other variables (see the next two paragraphs). Earnings expected at age 45 when marrying for the first time are assumed to equal the earnings predicted from this regression for age 45, with no adjustment for the secular growth in earnings across cohorts (see the discussion in Section II.6). "Unexpected earnings" simply equals the absolute value of the difference between actual and predicted earnings at the current age.

Married men tend to have higher earnings than separated or divorced men (16% higher in the 1967 SEO). If causality runs from earnings to marital status, as emphasized in this paper, expected earnings should be computed at actual marital status, and this is, in fact, how the expected and unexpected earnings variables in Table 2 are computed. However, expected earnings should be computed net of the effect of marital status if the causation runs from marital status to earnings (although unexpected earnings should still be computed at actual marital status.) Since there is evidence that the causation runs both ways (see Keeley 1974) we have estimated $\hat{E}$ and $|E - \hat{E}|$ both ways. The results with the measure of expected earnings net of the effect of marital status are qualitatively similar to those presented in Table 2 for $\hat{E}_1$ and $|\hat{E} - E_1|$ although somewhat weaker.

Similarly, regressions have been run with measures of expected earnings both gross and net of the effect of weeks worked. Again, the results presented in Table 2 for $\hat{E}_2$ and $|E - \hat{E}_2|$ are for the earnings measure which includes the effect of weeks worked on earnings; again the results using the measure of expected earnings net of weeks worked were qualitatively similar, but somewhat weaker.

The third measure of expected earnings, $\hat{E}_3$, incorporates neither the effect of marital status nor the effect of weeks worked on earnings. However, the effects of these variables are present in unexpected earnings.

We do not have to emphasize that our estimates of expected and unexpected earnings are extremely crude. They are used partly because direct evidence on earnings expectations are unavailable, and partly because the earnings generating function cannot be greatly expanded since the SEO survey does not contain information on ability, actual job experience, or other relevant variables.

46. For example, the regressions summarized by Table 2 were rerun replacing the variable $|E - \hat{E}|$ by the two variables $X_1 = (E - \hat{E}_1)$ if $(E - \hat{E}_1) > 0$ and $X_1 = 0$ otherwise, and $X_2 = -(E - \hat{E}_1)$ if $(E - \hat{E}_1) < 0$ and $X_2 = 0$ otherwise. The coefficients on these two variables were as follows: $X_1 = 0.099$ ($t = 1.22$), 0.032 (0.46), 0.16 (2.35), 0.053 (0.67), and 0.039 (0.41) in the five time duration intervals respectively, and $X_2 = 0.58$ ($t = 3.29$), 0.23 (1.49), 0.25 (1.56), 0.73 (0.42), and 0.27 (1.06) respectively. So in each interval both positive and negative deviations tend to raise the probability of dissolution.

47. 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.

48. Michael Grossman kindly supplied the following table based on the NBER-TH data:

	Married	Divorced
1. Current health = past health		
%	98.1	1.9
n	2518	48
2. Current health < past health		
%	97.4	2.6
n	1322	35
3. Current health > past health		
%	97.8	2.2
n	181	4

A Chi-squared test of the proportions in rows 1 and 2 yields a test statistic that is significant only at a .85 level of confidence; the test statistic for rows 1 and 3 is not at all significant. Information on health status comes from two questions asked in a 1971 survey: "What is the state of your general health at present (excellent, good, fair, poor)?" and "During the years you were attending high school what was the state of your general health (excellent, good, fair, poor, don't recall)?" Grossman (1976) analyzed these and other health data.

49. The very low explanatory power of these independent variables is partly explained by the low dissolution rates -- not more than 3.5 percent in each duration interval. The independent variables in the Terman Sample discussed later are not radically different from those used here, but the divorce rates are much higher, 4 to 16 percent, the sample sizes much smaller, and the coefficients of determination are much larger (at least .10).

50. Selective attrition or sample censoring as a cohort moves through time may bias the estimated effects from interval to interval.

51. The pooled regression is shown in the Appendix. The dependent variable is defined as zero if the man remained married in the particular five-year interval being considered, and as one if he divorced in that or any preceding five-year interval. The duration dummy variables are defined as zero for all subsequent intervals and as one for the particular and all preceding intervals. (E.g., the values of the four dummies for an observation on the 15-20 year of marriage are: $D_1 = 1$; $D_2 = 1$; $D_3 = 1$; $D_4 = 0$.)

The statistical significance of the coefficients in column (7) of Table 1 appears to be very high, but should not be taken seriously because the number of degrees of freedom is greatly overstated. The stastistical model can be written as

$$y_i = \beta_i X + \varepsilon_i,$$

where y_i equals 1 if a dissolution occurred at duration i or in any interval prior to i, X is a vector of independent variables that do not depend on the duration interval, β_i is a vector of coefficients that may depend on duration, and ε_i is the error term. Since y_i measures the cumulative incidence of dissolutions, an increase in ε_i not only increases y_i, but also y_{i+1}, y_{i+2}, etc. Therefore, the presumption is

that ε is serially correlated. Hence the standard errors used to compute the t values in column (7) may greatly understate the true standard errors because no allowance was made for the serial correlation in the error term. We have not attempted to make such an allowance.

52. Estimated at the mean values of the other explanatory variables, the duration dummy variables imply that the probability of divorce in the first four five year intervals declines from 3.89 to 2.12 to 2.03 to 1.84 respectively.

53. Assume that the error term ε_i defined in footnote 51 has two components, $\varepsilon_i = e_i + u_i$, where u_i is serially uncorrelated, and e_i has a first-order serial correlation

$$e_i = de_{i-1} \ .$$

Then

$$Y_i - dY_{i-1} = (\beta_i - d\beta_{i-1})X + u_i \ .$$

Since d is probably rather close to 1, this generalized first difference equation can be simplified to

$$\Delta y_i = y_i - y_{i-1} \approx \Delta\beta_i X + u_i = \gamma_i X + u_i \ .$$

This simple difference equation can be viewed as a series of estimating equations, one for each duration interval, in which the dependent variable measures the incidence of divorce in that interval. This equation provides the statistical rationale for the OLS regressions summarized in columns 1-5 of Table 1. (Whereas γ_i is a derivative of the unconditional probability in interval i, the estimated equations are conditioned on there having been no divorce in any prior period.) We are indebted to James Heckman for a helpful discussion on this formulation.

54. The probability of divorce P during the first 25 years equals

$$P = 1 - \prod_{i-1}^{5} (1 - p_i) ,$$

where p_i is the probability of divorce during the i^{th} five-year interval; hence the effect of any variable X on P would be

$$\frac{\partial P}{\partial X} = \sum_i \frac{\partial P_i}{\partial X} \left(\prod_{j \neq i} (1 - p_i) \right).$$

55. For the first marriage-interval, C_1 was defined as of the 15th month into the interval instead of at the beginning of the interval. Furthermore the analysis was restricted to women whose first child was not more than one year old at the date of first marriage. Hence C_2 was omitted from the first interval, and C_3 was omitted from the first four intervals.

56. The full OLS regression results are shown in the Appendix.

57. The turning points for women range from ages 23.7 to 32.5 across the five intervals. For men, see footnote 39.

58. 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 marriage by 1970 is considerably higher among women with a premaritally conceived first child: e.g., among women first married in 1965-69 the percent stably 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 six-months of marriage and 70.9 percent for women whose first birth occurred before first marriage.

59. There is evidence that parents spend more time with younger children than with older children [see Gronau (1976), Leibowitz (1974), Walker (1976), and for an international comparison, Stone (1972)], suggesting that the care of younger children is more marital-specific. Since divorce tends to reduce the time spent by both parents with their children, which presumably reduces the value of children to parents, the effect of divorce on the value of children is likely to be greater for the younger children (who absorb more time).

60. See Levinger (1965, p. 24), but also see Monahan (1955, pp 446-56).

61. See Carter and Glick (1970, p. 36), Plateris (1973b); and Jacobson (1959).

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

63. See Levinger's survey (1965, p. 24) for references to studies of the impace of differences in age and education.

64. The subjects were non-randomly selected from California elementary schools in 1921, and had an IQ exceeding 135; thus they are in the top 1% of the IQ distribution. (For more intensive discussions of the sample, see Terman (1929-59), Leibowitz (1974), or Michael (1976).)

65. If persons who marry someone of another religion are simply less committed to their religion, why should their dissolution rates be higher than those of persons who marry someone in their religion?

66. Rosenthal (1970, Table 2). For example, among Indiana couples previously single, 32 percent intermarried if they lived in communities with many Jews compared to 60 percent in communities with few Jews.

67. For example, in several small samples, Catholic girls who marry before age 19 intermarried about twice as frequently as Catholic girls marrying between 19 and 22; Protestant and Jewish girls and boys of all three religions also had much higher rates of intermarriage when they married early (see Burchinal and Chancellor (1962) and Rosenthal (1963).

68. 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.

69. 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 (1963)..

70. See Rosenthal (1970) for evidence on Jewish marriages in Iowa during 1953-63 and in Indiana during 1960-63.

71. The standard error is relevant evidence on discordance because an increase in search costs also increases the variability between the traits of mates (see Section I.3). Wessels (1976) provides additional evidence that variability is greater at the tails of a distribution of traits. Using a two-stage method that gives consistent estimates, the variance of actual to "predicted" levels of spouse's education (or age at marriage) is greatest at both tails of the education (or age at marriage) distribution for the U.S. population. He also shows that the average education of the spouse is less than that of the subject at the upper tail (consistent with the evidence on concept mastery from the Terman sample), and is greater than that of the subject at the lower tail of the distribution.

72. Comparison of this rate with comparable groups from the population at large is hampered by the fact that most Census information pertains to current marital status not marital history and we expect a relatively high rate of remarriage among Terman women (see implication 8 in Section I.6).

73. 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).

74. Further evidence that an increase in the wife's wage rate has a destabilizing effect on marriage is found in a study of the early experience of the income maintenance experiments in Denver and Seattle (see Hannan, Tuma and Groeneveld, 1976, pp. 60-61).

75. Other evidence comes from the analysis of aggregate data. Freiden (1974) finds that the fraction of women married in different states, counties of SMSA's is generally lower, even with age and several other variables held constant, when their wage rates are higher relative to those of men; Santos' findings (Santos, 1975) are similar.

76. In their report on the first 18 months of the Denver and Seattle income maintenance experiments, Hannan, Tuma and Groeneveld (1976) conclude "The overall impact of income maintenance is to increase the rate of marital dissolution" (p. 116). 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).

77. Let the true demand function for children be

$$C = \beta Z + a_0 X_h + a_1 X_w + a_2 \{X_h - (d_0 + d_1 X_w)\}^2 ,$$

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 $d_0 + d_1 X_w$ 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 $\{X_h - (d_0 + d_1 X_w)\}^2$ is a measure of the discrepancy between the optimal and the actual value of X_h. Its coefficient a_2 would be less than zero because the probability of dissolution will be higher and the demand for children smaller when the discrepancy is greater.

By expanding this measure, one gets

$$C = \beta Z + (a_0 - 2a_2 d_0) X_h + (a_1 + 2a_2 d_0 d_1) X_w + a_2 X_h^2 + a_2 d_1^2 X_w^2 - 2a_2 d_1 X_h X_w + a_2 d_o^2 .$$

Since $a_2 < 0$ and $d_1 > 0$, the coefficient of $X_h X_w$ is $\alpha = -2a_2 d_1 > 0$, and the coefficients of X_h^2 and X_w^2 are $a_2 < 0$ and $a_2 d_1^2 < 0$. If $d_0 \simeq 0$, the coefficients of the linear term are unaffected by any discrepancy.

Since X_h^2, X_w^2, and $X_h X_w$ are highly colinear, we eliminated X_h^2 and X_w^2 from the regression; this biases the coefficient of $X_h X_w$ downward -- i.e., against our hypothesis -- because the omitted variables are both positively correlated with $X_h X_w$.

78. As indicated in the previous footnote, this coefficient is probably biased downward.

79. Kiser (1968) used tabulations from the 1960 Census, and found evidence, especially at the extreme levels of education, that couples with similar educational levels had more children. He estimated that assortative mating "increased the fertility by about 7% for white wives age 35-44 and 11% for white wives age 45-54" (p. 112). Garrison, Anderson

and Reed (1968) state that couples with more similar education have more children primarily because they are less likely to be childless. Also see Willis (1974) and Ben-Porath (1974).

80. Participation in the labor force by married women is a (negative) proxy for marital-specific capital because women who participate are generally less specialized in nonmarket activities. Participation by wives should be greater, therefore, when the discrepancy between their traits and those of their husbands is greater. A regression was run for the same sample of SEO women and the same independent variables as in the regression in Table 7 but with the dependent variable equal to one if she participated in the labor force in 1966 and to zero otherwise. The negative and statistically significant coefficients for both the age and education interaction terms do suggest that wives invest more in market-oriented human capital when the discrepancy in traits is greater (the race variable has essentially no effect (a t-value of 0.17)).

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

82. OLS regressions are shown in the Appendix. Note that whereas the divorce probabilities analyzed in Section II.1 are conditional or marginal probabilities for each successive five-year interval, the probabilities of remarriage in Table 8 are cumulated over the total n years from the end of the first marriage. Hence the coefficients in Table 8 give the effect of each variable during the entire time span specified.

83. It would be better to measure the earnings potential of men over age 50 by their wage rate rather than annual earnings because annual weeks worked have a considerable "transitory" variation at these ages, and because remarriage itself might induce an increase in weeks worked and thus in annual earnings. We have rerun 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. For example, Sawhill, Peabody, Jones and Caldwell (1976) find that an increase in family income in a specified year (1967) raises the probability that divorced or widowed women remarry during the next five years (see p. 85). Hannan, Tuma and Groeneveld (1976) report generally positive but insignificant effects of "normal" earnings on remarriage rates for whites and for Chicanos during the first 18 months of the Denver/Seattle income maintenance experiment, but generally negative, insignificant effects for Blacks (see p. 87).

84. 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 (e.g., a regression coefficient, significant at $\alpha = .05$, implies a 0.6 month increase in duration per $1000 of expected earnings, holding other variables constant).

85. Hannan et al. (1976) also find an insignificant negative effect for women; Sawhill et al. (1976) report that they dropped an education variable from their analysis because of insignificance.

86. For example, 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, five years older, fell until the men were age 30-34 and rose thereafter (see accompanying table).

Index of number of unmarried men and women (age 30-34 = 100).			Ratio of eligible women to eligible men
Age	Men	Women	Women five years younger
25-29	144	111	1.39
30-34	100	100	0.90
35-39	84	111	0.96
40-44	73	121	1.23
45-49	74	142	1.33

Source: Census (1966).

87. 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. Since, however, the death rate of widows is significantly lower than that of divorcees, widows do appear to be "happier" than divorcees (see Fuchs, 1974b, p. 51).

88. 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: almost all quits and about 75 percent of layoffs were re-employed with negligible unemployment in data from the Coleman-Rossi survey (Bartel, 1975, p. 39).

89. According to a recent government publication (Plateris, 1973b, pp. 15-16) "before 1967, statistics on separation were collected only once, in 1907, and published for the entire 20-year period of 1887-1906 for the United States and every State". The median length of separation in that period in the United States was 2.8 years and the median in different states ranged from 1.8 to 5.7 years. For 16 states in the divorce registration area in 1969 the median duration of time from separation to divorce

ranged from 0.5 years in Kansas to 2.3 years in New York, and on average over 8 percent of the divorces occurred more than five years after separation (Plateris, 1973a, Tables 21 and 22).

90. The fraction 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. For example, five years after termination of the marriage, 48% of divorced men and 45% of widowed men in the SEO survey had remarried compared to 43% of divorced women and only 21% 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 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 figures from the U.S. Census Bureau for June, 1971:

First marriage ended by:	White men		White women	
	Number (000)	% remarried	Number (000)	% remarried
		Age 52-56 in 1971		
Divorcing	658	83.7	725	79.2
Widowing	176	68.8	719	35.3
		Age 47-51 in 1971		
Divorcing	786	84.1	889	76.8
Widowing	145	67.6	494	46.2
		Age 27-31 in 1971		
Divorcing	534	74.7	821	70.4
Widowing	15	73.3	69	50.7

Source: Census (1972b), Table 1

Our results suggest that these differences between widows and divorced persons would be eliminated and probably reversed if age at termination of the first marriage, and duration of exposure were held constant.

91. 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).

92. The regression results for men are also consistent with those from the SEO survey in two other regards: 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, although as noted in the previous footnote, the sample size is quite small for women.

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

94. Part of the explanation may be that men earn more than women since Table 8 clearly shows that higher earnings encourage remarriage. However, the greater nonmarket productivity of women and their greater investment in marital-specific capital presumably work in the other direction. Moreover, the earnings of divorced women would probably be higher if fathers had custody of children.

95. These predictions are estimated from regressions similar to those reported in Table 4 but estimated for divorced women alone.

96. Differences between the remarriage rates of widowed men and women are even larger than are those of divorced persons partly because widows are older (see footnote 90) and perhaps partly because widowed men try to remarry quickly in order to provide their children with a parent who has or will acquire child-rearing-specific skills.

97. 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).

98. Note, however, that widows also remarry at older ages, and yet apparently do not have higher probabilities of divorce.

99. 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 five years if ten years elapsed from termination of the first marriage to commencement of the third, during the the second five 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.

100. The other independent variables include age at current marriage, age, education, earnings (in the men's regressions only), and number of children from the current marriage (in the women's regressions only). Earnings probably should be omitted since it partly measures the expected gain from marriage, and therefore, picks up some of the explanatory power that should be attributed to the dummy variable measuring marriage order.

101. 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, 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.

102. The standardizations for age at current marriage, age and especially duration of current marriage were decisive in these findings for men and women. If the dummy variable distinguishing second and third from first marriages, and widows from divorced persons were the only independent variables, both men and women in later marriages would appear to have a smaller propensity to divorce than persons in first marriages. The explanation is mainly that persons in first marriages were generally married longer, and thus had more opportunity to divorce sometime during their marriage.

103. In 1953, the median duration to divorce was 6.5 years on first marriages, 3.5 years if both spouses were previously divorced once, and only 1.7 years if both were previously divorced twice (Monahan, 1959, Table III).

104. We are not dealing with completed duration of marriage for all those who ever divorce, but rather with completed duration for those who had divorced as of 1966. Hence, as of 1966, second marriages will not have been exposed as long to the risk of divorce, on average, as first marriages. Standardizing for age and age at marriage, therefore, holds constant length of time at risk. The regressions alluded to are not shown.

105. The 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 here 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. The positive effect of the pre-marital conception variable in the first marriage regressions (see (Table 4) may also be partly measuring the destabilizing effect of children from "prior" unions.

106. For example, after 10 years of marriage by women currently married who married between ages 23-26, 18 and 33 percent were childless, and the average number of children born to women with children was 1.87 and 1.53, in first and higher order marriages, respectively. Note, however, that children from prior marriages are excluded from these comparisons, and they may partly satisfy the demand for children even though they contribute to dissolution.

107. It was suggested at the outset of this paper that in the first fifteen years of marriage the probability of divorcing is perhaps ten-times as high as the probability of widowing. Using actual experience in the interval 1960-1966 reported in Census (1971), the probabilities of divorcing and widowing for men are 14.3 and 2.0 percent respectively and for women 15.7 and 3.4 percent respectively, e.g., about 7-fold for men and 5-fold for women. As the national divorce rate has more than doubled since 1960 (from 9.2 to 19.3 in 1974) the probability of divorcing in the first 15 years of marriage based on today's rates is probably twice as high.

108. Michael has begun a systematic analysis of the trend during the last two decades.

109. Although we have no direct evidence, there is indirect evidence from other laws; for example, minimum schooling laws have been mainly a response to increased enrollments in school (see Landes, Solmon (1972)).

110. According to Table 8, the probability of remarriage is higher for younger persons primarily during the first two years after a divorce.

111. The impact of a 10-year difference in age in Tables 1 and 4 is most strongly positive in the first two duration intervals. However, the comparison across intervals is somewhat misleading as a 10-year span in the first interval represents only 1.7 standard deviations in the independent variable while by the fifth interval, a 10-year span represents 3.3 standard deviations in the much-reduced dispersion in the independent variable, age.

Furthermore, the period of calendar time represented by these five marriage-duration intervals differs markedly, and divorce rates were considerably higher in the mid-1940's than at any other time period covered. The five marriage-duration intervals represented in the first five columns of Table 1 commenced on the average in the years 1946, 1951, 1954, 1956, 1958 respectively, so in higher-order intervals older men are more likely to have been observed during the time interval (1945-1947) in which divorce rates were especially high. That factor would tend to impose a negative coefficient on the age variable. The same qualification applies to Table 4.

112. 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.

Table A-1. Propensity to Dissolve First Marriage by Duration Married. White Men, Aged 35-55 in 1967. OLS Estimates. (t-values in parentheses).

	Duration Married				
	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years
AM	-2.09	-.83	-.84	-.57	.47
	(4.47)	(1.84)	(1.44)	(.68)	(.29)
AM^2	.37E-01	.15E-01	.13E-01	.97E-02	-.16E-01
	(4.24)	(1.77)	(1.13)	(.55)	(.44)
S	-.72E-01	.16	-.92E-01	.23	-.4E-02
	(.76)	(1.93)	(1.07)	(2.39)	(.03)
A	-.11	-.28E-01	.99E-01	-.25E-01	.39E-01
	(2.31)	(.65)	(1.90)	(.33)	(.25)
E	-.32	-.21	-.21	-.30	-.25
	(3.02)	(2.35)	(2.32)	(2.96)	(1.91)
E^2	.46E-02	.20E-02	.42E-02	.31E-02	.27E-02
	(2.24)	(1.15)	(2.47)	(1.75)	(1.35)
Constant	39.43	14.09	11.92	10.18	-1.00
r^2	.011	.003	.007	.006	.008
F	8.18	1.90	3.96	2.11	1.45
N	4413	4045	3337	2156	1089

Coefficients are percentage point effects.

Table A-2. Propensity to Dissolve First Marriage by Duration Married. White Women, Aged 35-55 in 1967. OLS Estimates. (t-values in parentheses).

	Duration Married				
	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years
AM	-2.18 (5.80)	-1.47 (3.28)	-2.11 (3.79)	-2.06 (3.27)	-1.84 (1.85)
AM^2	.38E-01 (4.91)	.23E-01 (2.37)	.40E-01 (3.23)	.40E-01 (2.72)	.39E-01 (1.59)
S	-.11 (1.11)	.25E-01 (.25)	.76E-01 (.73)	-.44E-01 (.43)	.52E-01 (.43)
A	-.44E-01 (.94)	-.62E-01 (1.28)	-.13E-01 (.25)	.4E-02 (.07)	.11 (1.08)
P	1.24 (1.02)	3.44 (2.91	1.03 (.84)	.92 (.78)	-1.98 (1.36)
C_1	-1.14 (1.98)	-2.57 (3.80)	-3.08 (4.92)	-2.02 (3.29)	1.04 (.83)
C_2			-1.79 (3.00)	-1.23 (2.61)	-.39 (.61)
C_3					.38 (.74)
$(C_1 + C_2 + C_3)^2$		.46 (2.33)	.43 (4.03)	.18 (2.45	.33E-01 (.47)
Constant	36.01	28.80	31.60	29.46	16.03
r^2	.014	.013	.012	.013	.009
F	12.63	10.09	6.85	5.23	1.83
N	5509	5184	4588	3235	1871

Coefficients are percentage point effects.

Table A-3. Cumulative Propensity to Dissolve First Marriage by Duration Married, with Dummy Variables for Duration. White Men, Aged 35-55 in 1967. OLS Estimates. (t-values in parentheses).

AM	-2.88 (8.68)
AM^2	.50E-01 (7.82)
S	.15 (2.33)
A	-.96E-01 (2.46)
E	-.65 (9.15)
E^2	.90E-02 (6.65)
D_1 (= 1 if dependent variable refers to duration of 5 or more years since date of first marriage)	2.12 (3.95)
D_2 (= 1 if dependent variable refers to duration of 10 or more years since date of first marriage)	2.03 (3.55)
D_3 (= 1 if dependent variable refers to duration of 15 or more years since date of first marriage)	1.84 (2.74)
D_4 (= 1 if dependent variable refers to duration of 20 or more years since date of first marriage)	1.46 (2.01)
Constant	49.77
r^2	.024
F	41.988
N	16824

Coefficients are percentage point effects

Table A-4. Cumulative Propensity to Remarry by Duration Since First Marriage Ended. OLS Estimates. (t-values in parentheses).

A. White Men, Aged 50-65 in 1967

	Duration Since First Marriage Ended: 2 years	5 years	10 years	15 years
AD	2.38	1.75	-.66	3.38
	(1.43)	(.78)	(.22)	(.97)
AD^2	-.36E-01	-.33E-01	-.92E-02	-.80E-01
	(1.71)	(1.11)	(.22)	(1.53)
S	.81	1.04	-.46	-.79
	(1.06)	(1.12)	(.47)	(.78)
Dur	1.02	1.13	.88	.94
	(2.49)	(2.20)	(1.56)	(1.54)
A	-.28	-.83E-01	.16	1.18
	(.49)	(.12)	(.23)	(1.66)
E	1.23	1.58	2.12	2.10
	(2.06)	(2.30)	(3.02)	(2.78)
W	-8.22	-3.26	-7.83	-9.85
	(1.51)	(.50)	(1.17)	(1.48)
Constant	-16.90	2.04	74.47	-24.14
r^2	.058	.052	.071	.113
F	3.02	2.39	2.78	3.80
N	354	310	261	216

Coefficients are percentage point effects

Table A-4 continued

B. White Women, Aged 50-65 in 1967

	Duration Since First Marriage Ended: 2 years	5 years	10 years	15 years
AD	.83 (1.30)	.88 (.88)	3.64 (2.57)	2.78 (1.48)
AD^2	-.17E-01 (2.14)	-.29E-01 (2.23)	-.77E-01 (3.82)	-.66E-01 (2.25)
S	-.36 (1.08)	-.25 (.50)	-.17 (.28)	-.79 (1.17)
Dur	.48 (2.40)	.73 (2.49)	1.13 (2.84)	.89 (1.72)
A	-.68 (2.77)	-.28 (.77)	-.78E-01 (.18)	-.95 (1.94)
Kids	-1.39 (2.24)	-1.25 (.05)	-2.92 (2.43)	-.50 (.36)
No kids	7.57 (1.41)	32.50 (4.45)	32.58 (4.06)	26.36 (3.28)
W	-12.26 (5.07)	-9.32 (2.73)	-10.23 (2.56)	-13.98 (3.22)
Constant	52.36	53.34	19.54	102.04
r^2	.084	.121	.135	.128
F	11.21	14.71	13.13	9.71
N	991	861	684	536

Coefficients are percentage point effects

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