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FACTORS AFFECTING DIVORCE: A STUDY OF THE TERMAN SAMPLE

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> Factors that contribute to the happy marriage . . . have been treated by innumerable writers. . . . Around few topics, indeed, has there ever accumulated such a hopelessly jumbled confusion of information and misinformation.
>
> Where light is so much needed but is so greatly lacking, even the most trifling contribution becomes a worthwhile goal.
>
> --Terman, 1938

1. Introduction. There was considerable effort by social scientists in the 1930's and 1940's to construct prediction equations for marital success.[1] These were in part inspired by the previous success of psychologists in predicting achievement in school by means of an IQ test.[2] These studies attempted to construct both an index of marital success and an estimating equation for predicting success by using personal and family background, economic and attitudinal information from the couple. Constructing the marital success index proved a manageable task, but the subsequent lack of attention paid these predicting equations is testimony to their limited usefulness.[3]

For the twenty years following these efforts, social scientists avoided such research with more determination than economists eschewing

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predictions about the economy's future. But within the past few years renewed interest in understanding marital behavior has resulted in a number of studies which focus on an equation estimating the probability of divorce or remarriage.[4]

This paper reports on one such effort. It offers a brief rationale for and an estimation of probability functions for divorce rates at specific lengths of marriage duration for a very unrepresentative sample of American women--a group of geniuses. The data are from the "Terman sample" of some 671 women selected in 1921 (together with a comparable group of men) by psychologist Lewis M. Terman. The sample was chosen from children enrolled in California schools in urban areas. It included children, preselected by their teachers, whose measured IQ was 135 or above. The sample thus represented students in the highest one percent of the school population in general intelligence. In addition to information obtained in the early 1920's from the children, their parents and their teachers, the subjects were resurveyed in 1927-28 and again in 1936, 1940, 1950-52, 1955 and 1960.[5] The available data file includes information on each individual's marital history and marital status in 1940, 1950 and 1960. That information is the basis of the study reported here.

This sample differs in many respects from those more often analyzed by economists or sociologists. There are both advantages and disadvantages in using these data. The advantages include: (a) The opportunity to study the marital behavior of people with unique social characteristics. Samples obtained from the general population by definition have relatively little information on the behavior of individuals

in the tails of distributions of characteristics--the very poor, the very wealthy, etc. With the Terman data we can determine if relationships observed in more general samples are also in evidence among geniuses. (b) The longitudinal (not retrospective) nature of the data allows us to study the impact of certain variables on marital patterns through time. (c) The data contain some information on the characteristics of both the subject and the spouse, so the sample is relatively well-suited for a study of marital behavior.

The disadvantages in analyzing the Terman sample include the following: (a) The sample is, by conventional standards, quite small; after any appreciable amount of cross classification, the data files have only a hundred or so observations. (b) The sample is also quite homogeneous with respect to many of the characteristics of interest, thus one cannot parcel out separate effects of variables as easily as in more diffused, broadly based samples. (c) Despite the abundance of some kinds of information, especially psychological and social variables, there is relatively little good information on economic variables. (d) Since the sample was selected from California schools, comparisons between the sample and a population at large are made more difficult by the differences in behavior between Californians and residents of other states.

In another report I have compared the marital behavior of these Terman subjects to the relevant California population, controlling for the very high level of schooling and the somewhat constricted distribution of age at first marriage among the Terman subjects (Michael 1976). The Terman subjects generally exhibited the same qualitative relationships

between marital patterns and such variables as age at marriage and schooling as the California population. Furthermore, there were remarkably few statistically significant differences between the Terman subjects and the Californians in terms of the proportions which had remained single by 1960, the proportions currently widowed or the proportions currently divorced in 1960; so the results reported below may be more generally applicable than one might think. However, one should keep in mind the very special nature of this sample when comparing results with other studies.

2. Analytical Context. An extensive statement of theoretical work on divorce appears in Becker, Landes, Michael (1976) and will be summarized quite briefly. The essence of that theory is that individuals enter into marriage only when doing so is expected to increase their well-being, broadly defined to include pecuniary and nonmarket real income. Activities outside as well as in the labor market are viewed as productive, and potential gains from marriage in the form of larger amounts of output accrue from (a) efficiency in production which results from mates' pooling resources (i.e., from economies of scale, specialization in the division of labor, and technical complementarity in the use of their own time) and from (b) joint consumption of public-goods aspects of household activities (e.g., both spouses enjoy the same paintings and share the same electric light). These gains can be shown to be greater the greater the level of resources of either spouse, the greater their ability to capitalize on the division of labor--e.g., by having different skills which can be substituted for each other--and the greater the similarity and complementarity between spouses in traits

used in joint productive activities. Individuals are assumed to search for a mate and to be constrained in their selection of a mate by their own limited set of abilities, traits or endowments through competition from others. Since search is costly, many marriages which take place may be less than ideal, although "optimal" in light of these costs.

The analysis of divorce assumes, likewise, that individuals divorce when doing so is expected to increase their real income broadly defined. Since the individual is assumed to marry when that action maximizes the expected net present value of real income, the analysis of divorce focuses on why that evaluation may change sufficiently to induce or justify divorce. Let M_t be the expected net present value of the person's real income at age t when married to a particular spouse. It is the discounted expected stream of benefits from the marriage net of the expected next best alternative marital arrangement. Aside from the costs of getting married, a person chooses to marry when $M_t > 0$, so the question of divorce is, if $M_t > 0$ why might $M_{t+k} < 0$? If one's expectation proved to be incorrect, either with respect to the benefits in this marriage (e.g., he is not what she thought he would be or she is not what she thought she was) or the alternatives available (e.g., via another spouse or an unforseen career), then M might change signs as new information is acquired. Alternatively, even if the expectations are borne out perfectly, it is possible that when evaluated at age 22, say, $M_{22} > 0$ but that after living out a few years of the marriage, the remaining streams yield, for example, $M_{30} < 0$. Here the divorce might have been fully anticipated, even planned for, at the outset.

Divorce doesn't automatically occur, of course, when $M < 0$. One reason is the cost of divorce. If C_t represents the many kinds of costs incurred in divorcing, then the individual chooses divorce when $M_t + C_t < 0$. These costs include not only the direct dollar and time costs involved in effecting the divorce, but the pecuniary and nonpecuniary capital losses in property, human capital, plans and memories.

The discussion here has not introduced the complication of which spouse it is that calculates these M's and C's, or what happens if M + C is negative for one spouse and positive for the other. This situation is ripe for a game-theoretic analysis with interdependent bilateral monopolists, but a case can be made that <u>if</u> the costs of negotiating, redistributing and policing are sufficiently small, then in principle at least the two parties can reach agreement. The partner for which $M + C > 0$ may have sufficient gains to be able to transfer enough real income to the other spouse so that after the transfer $M + C > 0$ for both. If so, they can agree to remain married; if not, there is some transfer which might leave $M + C < 0$ for both and they could agree to end the marriage. The disagreements which frequently accompany a couple's discussion of whether or not to divorce is sufficient evidence that these costs of negotiating, transferring and policing are generally not small! [Perhaps Callahan's self-interested guidance isn't too strong: "The subject of divorce is extremely complicated and no one without extensive legal training should attempt to solve his marital problems without the advice of an attorney" (Callahan, 1970)!] Whether the couple can agree or not, it is likely that the spouse who initially found $M + C > 0$ will be displeased at incurring a capital loss by either transferring some

income in order to maintain the marriage or by losing the gain entirely and incurring the cost of dissolution. (Becker, Landes, Michael (1976) discuss the issues in this paragraph in some detail.)

The results reported below estimate the impact of a small set of variables on the probability of dissolution of the first marriage. These variables are the level of schooling of the wife and the husband, the wife's age at first marriage, and two dummy variables, one reflecting whether either the husband or wife was Catholic (defined as 1.0 if so) and one reflecting whether the wife and husband had the same religious affiliation (defined as 1.0 if so). The explanatory variables represent characteristics of the individual or the marriage partnership at the time of marriage. Thus the five variables on which attention is focused are not themselves affected by the success of the marriage; they are more or less parametric to the couple by the time the marriage takes place.[7] Their impact on the stability by 1940, by 1950, and by 1960, of first marriages formed 1-4 years and 5-8 years before 1940 have been studied.

These five variables reflect several kinds of factors which may affect the value of M_t or C_t. One of these variables, AGE MARRIED, can be interpreted as reflecting the amount of information available to the marriage partners at the time of the marriage. The older one is at marriage, the better informed one should be about the prospective spouse and available alternatives. Likewise, the older one is the better one knows his or her own characteristics, and thus the better one should be at predicting the success of a marital relationship with any particular prospective spouse.

Thus, it is expected that age at marriage will be negatively related to marital dissolution. That relationship is one of the most

pervasive and robust in the literature on marital stability. So the prediction of a negative relationship is not strictly an hypothesis derived in the abstract from our theory. It indicates, instead, that the model described here can quite easily explain this ubiquitous finding, and that this sample of geniuses is expected to behave like other samples.

The variable CATHOLIC is a dummy variable defined as one if either spouse is Catholic and zero if not. A prediction that this variable is negatively related to marital dissolution is predicated on the strong religious teachings against divorce by the Catholic church. Expressed in the language of our analytical framework, the costs of divorce--defined broadly, as they should be, to incorporate all real income foregone--are higher for a Catholic and hence, this higher cost is expected to deter marital dissolution.

The SAME RELIGION dummy variable is defined as one if the spouses were of the same religious affiliation and zero if not. Sociological literature has, for decades, emphasized the destabilizing effects on marriage of differences in the religions of spouses. Landis (1949) and Bell (1938), for example, found the percentage of marriages which were dissolved to be between 4 and 6 percent for marriages composed of spouses who were both Catholic or both Jewish or both Protestant, compared to about 14 or 15 percent in marriages between mixed religious affiliations.[8] In the language of our analytical framework, similarity of religious beliefs or affiliation is one of the nonmarket traits which involves complementarity between spouses, and therefore, the more similar the pair the greater the economic gains from joint household production,

thus the smaller the probability of dissolution. Hence, this dummy variable is expected to be negatively related to marital instability.

The effects of the other two variables are more difficult to predict. Schooling levels reflect, as social scientists frequently emphasize, several different attributes and circumstances which include market earnings potential, knowledge of or proficiency in many market and home activities, several family and personal background characteristics, and perhaps differences in attitude, motivation, time perspective, and so forth. In the particular sample under study, the schooling levels of both spouses are relatively high, and less closely associated with intelligence and perhaps other personal characteristics such as health level than is true in more broadly defined samples.[9] These lower-than-usual correlations of schooling with background variables may partly justify the simplifying assumption that schooling level reflects labor market opportunities or wages. Becker's (1974) theory of marriage suggests that the higher the level of family real income, the greater the gains from marriage, thus the lower the likelihood of divorce. So the higher the schooling level of the family's primary earner, the higher the family income and hence the more stable the marriage. However, the gains from being married are expected to be greater the greater the <u>dissimilarity</u> between spouses in terms of traits used independently in activities, such as working in the labor market. So while a higher level of schooling of the primary earner enhances marital stability, a higher level of schooling of a family's secondary earner has, on the one hand, the same stabilizing "income effect" but it has, on the other hand, a destablizing influence by reducing the

gains from specialization in the division of labor within the family. Several studies have labeled this latter effect, applied to women, as an "independence effect."

Despite the considerable labor market activity of the Terman-sample women, it appears appropriate to assume that the husbands are the primary wage earners among the families in the Terman sample. If we assume that the only relevant (or at least predominant) effect of schooling on marital stability is through its effect on potential market earnings, we would expect an increase in the husband's schooling level to be associated with greater marital stability. Increases in the wife's schooling level would be expected to be less positively, or perhaps negatively, related to marital stability.

Perhaps it would be well to summarize the anticipated effects of these five variables on the stability of the marriage. In the framework used it is assumed that in considering divorce, individuals act as if they evaluate the difference between the benefits from the marriage over the rest of their lifetime and the benefits from their next best alternative marital life plan and then choose to divorce if that difference plus the costs of divorce is negative. The variables AGE MARRIED, SAME RELIGION, and SCHOOL HUSBAND are expected to be positively related to the gross gains from the marriage, hence negatively related to the likelihood of divorce. The variable SCHOOL WIFE will be negatively related to the net benefit from marriage if the "independence" or substitution effect dominates, and so it may be positively related to the likelihood of divorce. Finally, the variable CATHOLIC is expected to be positively related to the costs of divorce, and hence negatively related to the likelihood of divorce.

3. Empirical Implementation. The discussion above suggests that divorce will occur if the value of M + C is negative, so the probability of divorce for the jth couple, Pr_j, can be expressed as

$$Pr_j = Pr(M_j + C_j < 0) \qquad j=1,\ldots,n \text{ observations.} \quad (1)$$

The discussion also suggested five variables which are functionally related to the value of M + C and if we write

$$M_j + C_j = \phi(Y_{1j},\ldots,Y_{5j}) + \varepsilon_j \quad (2)$$

then

$$Pr_j = Pr(\phi(.) < -\varepsilon_j). \quad (3)$$

If $\phi_i' \equiv \frac{\partial \phi}{\partial Y_i} > 0$, then $\frac{\partial Pr}{\partial Y_i} < 0$: a variable which raises the net gain from remaining married lowers the probability of divorce. Writing Equation (3) as a linear function of Y_i,

$$Pr_j = a + \sum_i b_i Y_{ij} + e_j, \quad (4)$$

has the convenient property that b_i can be interpreted as the partial effect of variable Y_i on the probability of divorce. This linear probability model also has the well-known inconvenient property that the predicted linear relationship is not bounded at probabilities between zero and one. An often-used transformation which converts the continuous

variable bounded by 0 and 1.0 into a continuous, unbounded variable is $\ln(\frac{Pr_j}{1 - Pr_j})$ and so we might reformulate Equation (4) as

$$\ln(\frac{Pr_j}{1 - Pr_j}) = \alpha + \sum_i \beta_i Y_{ij} + u_j, \tag{5}$$

where the estimated coefficients β_i can be used to calculate the intuitively interpretable b_i.[10]

If data on individual couples are used, one has only a single, ex-post measure of that couple's probability of divorce--in particular, a probability 1.0 if the couple has divorced, and a probability 0 if they have not. It is well known that estimating Equation (4) directly with such a binary variable involves several statistical problems (see Nerlove and Press, 1973) and a direct estimate of Equation (5) by ordinary regression techniques is impossible since the dependent variable's values would be plus and minus infinity. But Equation (5) is mathematically equivalent to

$$Pr_j = \frac{1}{1 + e^{-a-\sum_i \beta_i Y_{ij} - u_j}}, \tag{6}$$

a logistic function which can be estimated by the generally available maximum likelihood procedure called logit.

Notice that the duration of time to which the probability of divorce Pr refers has not been mentioned. The effects of the passage of time on a relationship between Pr and Y_i can be either confronted analytically or conveniently defined away. The latter is accomplished

by simply defining Pr as the probability of divorce during the total time interval under study. One might then find, for example, that a one-year increase in age at marriage lowers by five percentage points the probability of divorce within the first four years of marriage. Here, one assumes that Equation (4) or Equation (5) applies directly to the probability defined over the whole time interval.

Alternatively, one might choose some basic time unit, such as a month or a year, and assert that the linear Equations (4) or (5) pertain to the probability defined for that time interval. Then, with specified relationships between (a) the per time unit probability from one time period to another and (b) the stochastic process through which that probability affects behavior, one models the time-dependent outcome. If we assume that one year is an appropriate time period, that the probability of divorce is constant from one year to the next, and that behavior can be represented as the result of a Bernoulli process, then if p is the yearly probability of divorce, the probability of divorce after n years, P_n, is:

$$P_n = 1 - (1-p)^n. \tag{7}$$

If we replace p in Equation (7) by its equivalent in Equation (4) or (6)

$$\frac{\partial P_n}{\partial Y_i} = \begin{cases} n(1-p)^{n-1} b_i & \text{given Eq. (4)} \\ n(1-p)^{n-1} \beta_i (Pr)(1-Pr) & \text{given Eq. (6)} \end{cases} \tag{8}$$

and in comparisons of the coefficients on P defined over n years and over m years,

$$\frac{(\frac{\partial P_m}{\partial Y_i})}{(\frac{\partial P_n}{\partial Y_i})} = \frac{m}{n}(1-p)^{m-n}. \tag{9}$$

So long as the relationship between Y_i and p, as well as the level of p, is constant over time, the coefficient of Y_i on P should rise nearly proportionately with $(\frac{m}{n})$ for small values of p.

Equation (7) implies that if p is linearly related to Y_i, as in Equation (4), or linearly related to the log of the odds, as in Equation (5), P_n and Y_i are <u>not</u> linearly related. But if we rewrite Equation (7) as

$$Z = 1 - \sqrt[n]{1-P_n} = p, \tag{10}$$

then Z is linearly related to Y_i if p is. But for the binary variable P_n defined as an ex-post probability 1.0 or 0,

$$\text{if } P_n \begin{matrix} = 1.0 \\ = 0 \end{matrix} \quad \text{then } Z \begin{matrix} = 1 \\ = 0 \end{matrix}, \tag{11}$$

so if p is related to Y_i as in Equation (4) or Equation (6), one can replace p by P_n in the estimating equation and subsequently calculate b_i, the coefficient of Y_i on the unit probability p by Equation (8).

Of course, more complex solutions to the estimation of the effect of Y_i on p pertain if p is assumed to be altered by the outcome of the stochastic process in preceding time intervals, or if the influence of Y_i is assumed to vary over time. These solutions are not investigated here.

4. Empirical Results. Two subsamples of women from the Terman sample have been studied. The subsamples were defined by the duration of time the women were exposed to the risk of divorce. One group contained 114 women first married between one and four years prior to 1940; the other group contained 97 women first married between five and eight years prior to 1940. Because of the nature of the available information, these two groups exclude women first married by or before age 20.[11]

Table 1 indicates means and standard deviations of a set of variables for these two groups of women. The variable DIVORCED 1940 is defined as 1.0 if the woman's first marriage had ended by divorce or separation by the time of the 1940 survey, and is defined as 0 otherwise. The table indicates that about 4 percent of these 114 women were divorced or separated by 1940. The variable DIVORCED 1950 indicates that among the same set of 114 women, by the 1950 survey approximately 12 percent had been divorced (that 12 percent includes the 4 percent already divorced by 1940). Similarly, DIVORCED 1960 indicates that about 16 percent had been divorced by 1960. These three variables have each been used as dependent variables in estimated linear and logistic relationships with the five variables discussed above, SCHOOL WIFE, SCHOOL HUSBAND, AGE MARRIED, SAME RELIGION, and CATHOLIC. Table 2, Panel A, contains the estimated coefficients for the group of 114 women first married one to

Table 1. Means and standard deviations of selected variables for Terman women first married 1-4 years before 1940 and 5-8 years before 1940.

	Women first married			
	1-4 yrs before 1940		5-8 yrs before 1940	
	mean	s.d.	mean	s.d.
DIVORCED 1940	0.044	(0.21)	0.093	(0.29)
DIVORCED 1950	0.123	(0.33)	0.175	(0.38)
DIVORCED 1960	0.158	(0.37)	0.196	(0.40)
SCHOOL, WIFE	15.658	(1.86)	15.763	(1.91)
SCHOOL, HUSBAND	15.193	(2.48)	14.979	(2.59)
AGE MARRIED	24.465	(2.32)	23.381	(1.94)
CATHOLIC	0.079	(0.27)	0.062	(0.24)
SAME RELIGION	0.842	(0.37)	0.887	(0.32)
IQ	149.877	(12.84)	148.557	(10.14)
AGE, WIFE	27.316	(2.42)	29.876	(2.06)
AGE HIGH SCHOOL (WIFE)	16.538	(0.73)	16.592	(0.85)
AGE, HUSBAND	31.825	(4.75)	34.216	(4.79)
AGE MARRIED, HUSBAND	28.079	(4.33)	26.980	(4.71)
YRS. SINCE MARRIAGE 1940	2.851	(1.07)	6.495	(1.20)
SIBS, WIFE	1.640	(1.56)		
SIBS, HUSBAND	2.188	(1.82)		
FATHER'S SCHOOL, WIFE	12.447	(3.77)		
MOTHER'S SCHOOL, WIFE	12.368	(2.66)		
HEALTH, WIFE	0.193	(0.40)		
OCCUPATION, HUSBAND, 1940	0.228	(0.42)		
BOTH CATHOLIC	0.026	(0.16)		
BOTH JEWISH	0.026	(0.16)		
BOTH PROTESTANT	0.544	(0.50)		
BOTH NO RELIGION	0.167	(0.37)		
BOTH OTHER RELIGION	0.044	(0.21)		
CATHOLIC, WIFE	0.044	(0.21)		
CATHOLIC, HUSBAND	0.061	(0.24)		
WIDOWED, 1940	0.000	--		
WIDOWED, 1960	0.044	(0.21)		
Sample size	114		97	

Table 2. OLS regression and logit estimates of effects of five variables on the probability of divorce by duration of time since first marriage.

Panel A

Women First Married 1-4 Years Prior to 1940

Explanatory Variables	OLS Regressions			Logistic Functions		
	by 1940	by 1950	by 1960	by 1940	by 1950	by 1960
SCHOOL, WIFE	.0032 (0.29)[a]	.0346 (1.99)	.0321 (1.63)	.0040 (0.30)	.0472 (2.02)	.0408 (1.67)
SCHOOL, HUSBAND	.0037 (0.47)	-.0250 (-.198)	-.0264 (-1.85)	.0056 (0.59)	-.0299 (-2.02)	-.0297 (-1.88)
AGE MARRIED	-.0110 (-1.34)	-.0360 (-2.77)	-.0379 (-2.58)	-.0122 (-1.09)	-.0507 (-2.50)	-.0493 (-2.41)
SAME RELIGION	-.2063 (-3.64)	-.2546 (-2.85)	-.2173 (-2.15)	-.1315 (-2.92)	-.2090 (-2.45)	-.1838 (-1.90)
CATHOLIC	-.1533 (-2.02)	-.1246 (-1.04)	-.1462 (-1.08)	-.4552 (-0.11)	-.0967 (-0.70)	-.1344 (-0.82)
CONSTANT	.3940	1.0648	1.1792	.1108 (0.36)	.8635 (1.62)	.9166 (1.63)
Adjusted R^2	.086	.116	.082			
F	2.91	3.74	2.80			

[a] t-values in parentheses.

Continued

Table 2 (concluded)

Panel B

Women First Married 5-8 Years Prior to 1940

Explanatory Variables	OLS Regressions			Logistic Functions		
	by 1940	by 1950	by 1960	by 1940	by 1950	by 1960
SCHOOL, WIFE	.0260 (1.52)[a]	.0442 (1.98)	.0563 (2.39)	.0276 (1.46)	.0483 (1.88)	.0622 (2.25)
SCHOOL, HUSBAND	-.0351 (-2.84)	-.0513 (-3.18)	-.0459 (-2.69)	-.0384 (-2.55)	-.0545 (-2.92)	-.0484 (-2.56)
AGE MARRIED	-.0110 (-0.73)	-.0125 (-0.63)	-.0127 (-0.61)	-.0088 (-0.48)	-.0101 (-0.44)	-.0109 (-0.46)
SAME RELIGION	-.2526 (-2.50)	-.3198 (-2.42)	-.3077 (-2.21)	-.2110 (-2.34)	-.3058 (-2.33)	-.3042 (-2.16)
CATHOLIC	-.0968 (-0.73)	-.2321 (-1.34)	-.2295 (-1.26)	-.1036 (-0.78)	-.1704 (-1.22)	-.2680 (-1.17)
CONSTANT	.6967	.8390	.5816	.2952 (0.64)	.3104 (0.53)	.0245 (0.04)
Adjusted R^2	.097	.107	.084			
F	2.83	3.07	2.53			

[a] t-values in parentheses.

four years prior to 1940, and Panel B contains the estimates for the group of 97 women first married five to eight years prior to 1940.

The qualitative effects of these five variables are, generally, as expected: the probability of divorce appears to be lower for couples with both spouses sharing the same religious affiliation, with at least one of the spouses Catholic, with the wife's age at first marriage relatively high, with the husband's schooling level relatively high, and with the wife's schooling level relatively low.

The effect is quite strong for the SAME RELIGION variable. This coefficient can be interpreted as indicating that where both spouses have the same religion, other things the same, the couple's probability of divorce within the first four years of marriage is 20 percentage points lower than if the spouses had different religious affiliations. (The logit estimates suggest a reduction of 13 percentage points.) That effect is quantitatively quite large, persists over time, and is observed in both the samples reported in Panel A and in Panel B. The CATHOLIC variable also has a quite large coefficient throughout these estimates, but its statistical significance is lower, especially in the logit estimates where the coefficients are also erratic.

The wife's age at marriage seems to have a small but persistent negative effect on the probability of divorce. That variable shows considerable statistical significance in the 1950 and 1960 regressions, but only in Panel A. Using the coefficient from the first column of Panel A for illustration, an increase in the age at marriage from one standard deviation below the sample mean to one standard deviation above the sample mean (i.e., from age 22.2 to age 26.8) would be associated

with a 5 percentage-point reduction in the probability of divorce by 1940 and a 17 percentage-point reduction in the probability of divorce by 1960. The reader should recall that the distribution of AGE MARRIED is truncated at age 21. Independent evidence suggests that the relationship between age at marriage and marital dissolution is nonlinear and stronger at lower ages, so these coefficients reflect the effect of age at marriage in a range in which that effect is relatively small.[12]

Husband's schooling tends to have a negative effect on divorce with the magnitude of that effect, at -0.03, suggesting that four years more schooling is, on the average, associated with a 12 percentage-point reduction in the probability of divorce. The wife's schooling level is persistently positively associated with the probability of divorce.

Two other questions about the equations reported in Table 2 deserve attention: How well do these equations distinguish the maritally unstable from the maritally stable? What do these estimates of probability of divorce at three distinct points in time suggest about the impact of these explanatory variables over time? The adjusted-R^2 in the OLS regressions range between 8 and 12 percent, so one answer to the first question is that about 10 percent of the observed variation in the dependent variable is correlated with these five variables. That level of explained variance is surely not overwhelming, but neither is it exceptionally low when compared to other regression results with micro data pertaining to demographic phenomena. The usual tests of significance of the equation are not appropriate, since the error term cannot be presumed to be distributed normally.

To obtain an intuitive sense of the equation's ability to predict marital dissolution, the probability of divorce has been calculated using the estimating equations in Table 2 for each observation. The observations were grouped into three subgroups from each of the two samples of married women: subgroup A included only those women who had been divorced by 1940; subgroup B included those women who were maritally stable in 1940 but who were divorced by 1960; and subgroup C included those women whose first marriage had not ended in divorce or separation by 1960.

Table 3 indicates the average probability of divorce calculated from the linear and logistic functions for the women in each of these three groups. The 1940 equation from Panel A, for example, discriminated between the maritally unstable by 1940 and the maritally stable by yielding a predicted probability of dissolution of 15.7 percent for the former group and 3.7 percent for the latter. More interesting is the fact that the same equation (which was itself estimated for a dummy variable defined as 1.0 for the observations in group A and 0 for the observations in groups B and C) discriminated with some success between those who were stable in 1940 but did not remain stable by 1960 (group B) and those who were stable in 1940 and did remain stable by 1960 (group C). It yielded estimated probabilities of divorce appreciably higher for group B in the OLS estimates, but did so for the logit estimates only in the case of those married 5-8 years prior to 1940. Using the 1960 estimating equations from Table 2, again the unstable (A's and B's) were successfully discriminated from the stable (the C's), and here, too, the equation yielded a higher estimated probability of divorce for those

Table 3. Probability of divorce estimated from the OLS regression and logit estimates in Table 2, by 1940 and by 1960, for three groups.

Group A: Those divorced by 1940
Group B: Those stable in 1940 but divorced by 1960
Group C: Those stable in 1960

Group	Women married by 1-4 years prior to 1940		Women married by 5-8 years prior to 1940	
	OLS estimate	Logit estimate	OLS estimate	Logit estimate
		Using 1940 equation		
A	15.7%	22.3%	21.5%	21.1%
B	5.2	3.3	11.5	11.8
C	3.7	3.6	7.6	7.6
		Using 1960 equation		
A	29.1	30.1	34.3	34.7
B	24.0	25.7	25.1	25.5
A+B	25.4	26.9	29.4	29.9
C	14.0	13.7	17.2	17.1

who had divorced relatively early (i.e., compare the predictions for the A's with the predictions for the B's). Here the OLS and logit estimates yielded remarkably similar results. Lest the reader be more optimistic about the usefulness of these prediction equations than is justified, it should be noted that these estimates have quite large standard errors. We have not as yet produced a tool with which to equip marriage counselors or judges![13]

The second question pertained to the implied changes as time passes in the relationships between the explanatory variables and the probability of divorce. This is a most difficult issue. One of the difficulties in analyzing longitudinal data is that if the probability of a nonrepeating event occurring differs among the individuals in a sample, then there will be a differential rate of its occurrence over time from a sample cohort. That differential rate of occurrence from time period to time period alters (biases) estimates of behavioral responses.[14] One of the reasons for analyzing the total interval of time since marriage in this paper was to circumvent the problem of selective attrition through divorce from time interval to time interval. Although successfully avoided in estimating the effects over the total time interval, the problem reappears when one attempts to interpret the coefficients in a per-unit time context. The interpretations over the whole time period are nevertheless valid.

Regarding changes in the effects of the explanatory variables on divorce over successively longer total time intervals, a very rough generalization from Table 2 might be that the magnitudes of the coefficients of most of the variables tend to increase as the length of time

increases between 1940 and 1950, but not so thereafter.[15] As these coefficients reflect the marginal effect of the variable on the probability of divorce over the total time span, their increase when estimated over successively longer time intervals suggests that the effects of age at marriage, religion, and schooling levels persist over time, at least through the first dozen years or so of marriage.

It is tempting to investigate the implied effects of Y_i on the yearly probability of divorce despite the biases discussed. As shown above, if the probability of divorce per year, p, is constant over time for each couple and differs among couples as summarized in Equation (4) (or Equation (6)), then the effect of Y_i on p can be estimated from the coefficients of Y_i on P_n defined over n years using Equation (8). Using the coefficients in Panel A of Table 2, the estimated effects of the five variables on p as estimated by the 1940, 1950 and 1960 OLS regressions are shown in Table 4.[16] The -.085 in the first column can be interpreted as indicating that both spouses sharing the same religion lowers the yearly probability of divorce by 8.5 percentage points when estimated over the first one to four years of marriage. Except for the wife's schooling level, the estimated effect of Y_i on p is smaller the longer the time interval on which the estimate is based. If that is so, then p is not constant over time and the Bernoulli-trial model underlying the calculations shown in Table 4 is inappropriate. Table 4 suggests that although the effects of these variables on the probability of divorce persist over time, they attenuate as time passes. But this inference of attenuation may be incorrect if the selective attrition resulting from heterogeneity in the sample biases the estimated coefficients downward.

Table 4. The estimated partial derivatives of the yearly probability of divorce, p, with respect to Y_i estimated from OLS regressions on marital status by 1940, by 1950, and by 1960.

Y_i	Regression		
	1940	1950	1960
SCHOOL, WIFE	.001	.003	.002
SCHOOL, HUSBAND	.002	-.002	-.001
AGE MARRIED	-.005	-.003	-.002
SAME RELIGION	-.085	-.023	-.011
CATHOLIC	-.063	-.011	-.008

To summarize, this regression and logit analysis indicates that among the Terman women studied, marital stability is positively related to the wife's age at marriage, to the schooling level of the husband, to the fact that at least one of the spouses is Catholic, and to the fact that the two spouses express the same religious affiliation, and is negatively related to the level of schooling of the wife. These results pertain to the stability of marriages over a total specified length of time ranging from one to four years of marriage to 25-28 years of marriage. There is evidence that the effects of these variables persist over time, but that the effects attenuate as time passes. The effect of the wife's level of schooling appears to deteriorate least over time, but none of the cumulative effects over time rise sufficiently to imply a constant impact of the variable on the per-year probability of divorce. There are, as noted, however, potentially serious deficiencies in the evidence on which this latter conclusion is based.

5. Modifications. In the course of the regression analysis described above, several modifications were attempted and some will be mentioned briefly. Only one of these modifications is of interest for the results obtained; the others are mentioned primarily to indicate their lack of effect on the original five variables.

For the sample of women first married one to four years prior to 1940, the dummy variable SAME RELIGION was decomposed into five dummy variables defined as one if the spouses were BOTH CATHOLIC, BOTH JEWISH, BOTH PROTESTANT, BOTH NONE, or BOTH OTHER RELIGION. These five dummy variables replaced the SAME RELIGION and CATHOLIC variables in one

regression estimate, while these five variables plus two separate dummies indicating whether each spouse was Catholic were used in a second regression. These variables' means and standard deviations are included in the variable list in Table 1. The resulting regression estimates are shown in Table 5. These results are comparable to the OLS regressions in Panel A of Table 2.

A comparison of the results in Tables 5 and 2 reveals that the effects of the non-religion variables are not greatly affected by the changes in the religion variables. The religion variables themselves showed several interesting results. The magnitude of the effect of both spouses having the same religious affiliation is remarkably similar across religions in the first few years of marriage. The particular religion does not seem to matter. This result is quite understandable if, as discussed above, the variable reflects one dimension of complementarity between spouses in a relevant nonmarket trait. Indeed, this result is more understandable than the result reported by Weeks (1943) or by Landis (1949).[17] However, while the effect of SAME RELIGION in the regressions in Table 2 suggest a relatively constant partial effect as time passes, a comparison of columns 1 and 3 in Table 5 reveals that, in this sample at least, the stabilizing influence differs considerably among religions over time. In particular, the Catholic couples are persistently more stable while the stabilizing effect of religion for Jewish couples especially is not evidenced at all over the entire 21- to 24-year period. The result for Catholics is explained, I think, by the effect of the Catholic religion on the costs of dissolution. If the full cost of marital dissolution is higher for couples of

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.

Explanatory Variable	Probability of Divorce by 1940		by 1960	
SCHOOL, WIFE	.0090 (0.83)	.0076 (0.72)	.0409 (2.02)	.0398 (1.94)
SCHOOL, HUSBAND	.0054 (0.69)	.0071 (0.95)	-.0284 (-1.97)	-.0274 (-1.87)
AGE MARRIED	-.0133 (-1.65)	-.0111 (-1.42)	-.0408 (-2.74)	-.0392 (-2.56)
BOTH CATHOLIC	-.2407 (-2.03)	.2827 (1.43)	-.3870 (-1.76)	-.1157 (-0.30)
BOTH JEWISH	-.2254 (-1.94)	-.3090 (-2.72)	.0291 (0.13)	-.0110 (-0.04)
BOTH PROTESTANT	-.2453 (-5.09)	-.3282 (-6.38)	-.2515 (-2.82)	-.2909 (-2.89)
BOTH NO RELIGION	-.2505 (-4.13)	-.3349 (-5.35)	-.1582 (-1.41)	-.1986 (-1.62)
BOTH OTHER RELIGION	-.2746 (-2.82)	-.3513 (-3.69)	-.2680 (-1.49)	-.3030 (-1.63)
CATHOLIC, WIFE		-.2839 (-2.05)		-.1749 (-0.65)
CATHOLIC, HUSBAND		-.3178 (-3.17)		-.1330 (-0.68)
CONSTANT	.3457	.3707	1.1318	1.1329
Adjusted R^2	0.170	0.246	0.104	0.093
F	3.73	4.55	2.49	2.04

the Catholic faith, that higher cost probably does not decline appreciably over the lifetime. So the cost of divorcing imposed by Catholicism presumably persists over time, while the similarity in interests or the absence of conflict present in other marriages of like-religion spouses might deteriorate over time.

The second and fourth columns of Table 5 decompose the Catholic religion effect into the partial effect on stability of each spouse being Catholic. The results indicate that there is very little difference in terms of the probability of divorce whether the wife or the husband is Catholic--the partial effects in the first four years of marriage are -0.28 and -0.32, respectively. Results for 1940 imply the somewhat surprising conclusion that there is no additional effect of both spouses being Catholic--the partial effect of both spouses being Catholic given that one spouse is Catholic is approximately zero.[18] In the 1960 regression the effects of the three Catholic variables are considerably weaker.

An additional, closely related regression might be mentioned here. Terman gave a "marital happiness" test to the subjects and their spouses in 1940, based on his own extensive research on marriage. For the 109 maritally-stable couples in 1940 in my subgroup of women married one to four years before 1940, I regressed the same five variables used in Table 2 on the marital happiness scores of the subjects and spouses separately.[19] In the regressions on the subjects' and spouses' marital happiness scores, the results were:

$$\text{Subject's score} = 84.5 - \underset{(-2.8)}{2.6}(\text{SCHOOL, WIFE}) + \underset{(1.4)}{0.9}(\text{SCHOOL, HUSBAND})$$

$$+ \underset{(0.6)}{0.5}(\text{AGE MARRIED}) - \underset{(-0.7)}{3.5}(\text{SAME RELIGION})$$

$$- \underset{(-3.5)}{22.5}(\text{CATHOLIC}) \qquad \bar{R}^2 = .12 \qquad F = 3.71$$

(t in parentheses)

$$\text{Husband's score} = 68.7 + \underset{(1.3)}{1.1}(\text{SCHOOL, WIFE}) - \underset{(-2.0)}{1.2}(\text{SCHOOL, HUSBAND})$$

$$- \underset{(-0.6)}{0.4}(\text{AGE MARRIED}) + \underset{(1.7)}{8.2}(\text{SAME RELIGION})$$

$$+ \underset{(0.1)}{0.7}(\text{CATHOLIC}) \qquad \bar{R}^2 = .04 \qquad F = 1.60$$

Two quite interesting results emerged: in the first regression the Catholic variable was very strongly negatively related to the marital happiness score. That is what one might have expected. Other variables which adversely affect the success of the marriage, e.g., AGE MARRIED, would presumably lead to divorce and among those still married one would not expect a strong relationship with a true "marital happiness" score. But the Catholic variable is related to the cost of divorce. At a given level of marital dissatisfaction, a Catholic couple would not be expected to divorce as readily as a non-Catholic couple. So among those still married one would expect a lower average score for Catholics on a marital happiness scale. For the subjects here that phenomenon is very much in evidence. The other interesting thing to

note about these two equations is that in each, own-schooling lowers while spouse's schooling raises marital happiness, suggestive of the perceived contributions to and gains from the marriage.

Since the Terman data contained several additional background variables, the 1940 and 1960 regressions were rerun with seven variables added to the original set of five. These additional variables were the husband's age at marriage, the number of siblings of the wife and husband, the education level of the father and mother of the wife, the wife's self-assessed health status in 1940 (defined as one if she considered her health "poor" or "fair") and a dummy variable reflecting the husband's occupation in 1940 (defined as one if he was a physician, lawyer, college professor or engineer). These regressions are shown in Table 6. The new variables deserve little comment. Relatively poor health in 1940 and more siblings of the wife seem to be correlated with greater marital instability, but on the whole these variables add little to the analysis. Of some note, however, is the small impact these seven variables had on the five original variables' coefficients. The magnitude of the religion variable's coefficient increased by several percentage points, but the age at marriage and wife's education coefficients were practically unaffected. The husband's schooling level was affected somewhat, probably by the inclusion of the husband's occupation dummy. My conclusion from studying the modifications reported here as well as several others is that the coefficients on the original five variables are quite insensitive to the inclusion of other variables, or to minor modifications in the definition of the sample.[20]

Table 6. Additional OLS regressions on the probability of divorce by 1940 and 1960 for women first married 1-4 years prior to 1940.

Explanatory Variable	1940	1960
SCHOOL, WIFE	.0037 (0.32)	.0438 (2.16)
SCHOOL, HUSBAND	.0146 (1.64)	-.0050 (-0.32)
AGE MARRIED	-.0092 (-1.01)	-.0353 (-2.17)
SAME RELIGION	-.2359 (-4.24)	-.2649 (-2.67)
CATHOLIC	-.2097 (-2.83)	-.2469 (-1.86)
SIBS, WIFE	.0199 (1.70)	.0434 (2.08)
SIBS, HUSBAND	.0061 (0.57)	.0046 (0.24)
FATHER'S SCHOOL (WIFE)	-.0078 (-1.30)	-.0073 (-0.68)
MOTHER'S SCHOOL (WIFE)	.0164 (1.88)	.0008 (0.04)
HEALTH, WIFE	.1276 (2.55)	.2582 (2.89)
OCCUPATION, HUSBAND (1940)	-.0747 (-1.50)	-.1470 (-1.66)
AGE MARRIED, HUSBAND	.0018 (0.36)	.0009 (0.10)
CONSTANT	-.0045	.6132
Adjusted R^2	.173	.169
F	2.86	2.80

A comparison of results reported here and results from other studies of marital instability is complicated by at least two factors. First, this sample is quite atypical. It is comprised of a group of women with measured IQ's over 135 who spent at least some of their childhood in California and spent all of their adulthood being periodically reminded by reinterviews that they were exceptionally gifted and under more-than-usual social scrutiny. Despite these differences, there is evidence that in terms of some aspects of marital behavior--marriage rates and current divorce status--the Terman subjects did not behave in a substantially different manner from others of their cohort, adjusted for schooling level and state of residency (Michael 1976). Yet the sample is surely atypical in terms of the range and variation in the variables studied and that, in the case of such nonlinear effects as age at marriage, helps explain some differences in estimated effects.

Second, the estimated effects reported here are obtained from a somewhat different methodology than frequently employed. Both intuition and the type of model outlined in this paper suggest that there are important dynamic aspects to marital behavior--couples do things in one time period which affect the likelihood of divorce in subsequent periods and conversely the likelihood of divorce influences decisions about such things as the acquisition of capital assets such as buying a home, moving one's family across country, or having a (or another) child. Capturing these simultaneous relationships statistically can be done in two ways: either a fully dynamic model can be explored (a route no researcher has taken so far as I am aware), or a sequential model can be estimated in which each successive time-period is studied separately with

statements about conditional probabilities (so far as I am aware, only the Becker, Landes, Michael (1976) study takes this approach).

Most investigations of marital instability do neither. They ignore or avoid the dynamic process altogether. The present study avoids the dynamics by studying factors which are themselves invariant with duration of marriage and by investigating their impact on divorce over the total interval of time from marriage to some specified date--e.g., the first four years of marriage or the first 24 years of marriage. In this methodology the dynamics are not studied. Only the total or gross effect of, say, age at marriage on the probability of divorce by the 24th year of marriage is estimated (e.g., in Panel A of Table 2 that effect is estimated as -.0379: roughly speaking, marrying one year older lowers the probability of a divorce by the 24th anniversary by about four percentage points). This methodology does not reveal how the age at marriage effect works its way out in terms of time or in terms of influence through intervening behavior such as childbearing. But neither is this methodology biased by the dynamics. No other recent study of divorce which I have seen uses this methodology.

Several studies use longitudinal data with information on behavior over a short interval such as six months or a few years. These studies often look at the effects of variables on the probability of dissolution during that fixed-length period, but the period is drawn from different locations in the marriage-duration spectrum. As an example, one couple may be observed in their second to fifth years of marriage, while another may be in their sixteenth to nineteenth years of marriage. This procedure ignores the dynamics. Only if the exogenous

variables have the same effect at each duration of marriage for a given family and its different effects among families are independent of the average probability of divorce among families can this procedure be used to estimate the exogenous variable's average effect; otherwise, the estimated coefficients are biased by selective attrition.[21] In addition, such studies often use as explanatory variables factors such as number of children or wife's labor force status which probably reflect as well as affect differences in the probability of divorce. Simultaneity biases result from such a procedure.

FOOTNOTES

1. These studies include Terman's (1938) study of some 400 variables affecting the marital happiness of a group of 800 married couples surveyed in the mid-1930's, Burgess and Cottrell's (1939) sociological study of some 500 couples surveyed in 1931-33, and a study of several hundred married and divorced couples surveyed between 1938-44 by Locke (1951). Also see Terman and Wallin (1949).

2. In motivating his extensive marriage study, Terman wrote, "Twenty years ago the use of intelligence tests in the selection and guidance of college students aroused widespread derision, but at present admission to college is denied to thousands of high school graduates every year in part on the basis of their intelligence scores. . . . Inasmuch as our data suggest that marital happiness can be predicted by our scale almost as accurately as the college success of a high school graduate can be predicted from an intelligence test, we are sanguine enough to believe that such a scale, once its validity has been thoroughly established, will not be entirely neglected." (Terman, 1938, p. 6)

3. A recent paper by Welch (1976) suggests that the reliance on the IQ tests referenced in the preceding footnote might best have been avoided as well.

4. These studies have been prompted partly by recent increases in divorce rates and median age at first marriage, partly by recent theoretical advances and partly by availability of new large-scale data sets. The studies include Bumpass and Sweet's (1972) analysis of marital instability

from the 1970 National Fertility Survey; Ross and Sawhill's (1975) study of divorce from the University of Michigan's Survey of Income Dynamics; Kneisner's (1975) preliminary work with the National Longitudinal Surveys; studies of the marital behavior evidenced in the New Jersey and Denver/Seattle income maintenance social experiment by Sawhill, Peabody, Jones and Caldwell (1975) and Hannan, Tuma and Groeneveld (1976, preliminary) respectively; and Becker, Landes and Michael's (1976, preliminary) study of the Survey of Economic Opportunity data. The final three studies consider both first marriage dissolution probabilities and remarriage probabilities.

5. The analysis of these data by Professor Terman and his associates is reported in a several-volume study entitled Genetic Studies of Genius, edited by Lewis M. Terman (1925-1959). Incidentally, this is a wholly independent sample from the one used in Terman's study of Psychological Factors in Marital Success (Terman, 1938).

6. The data were provided to NBER by Professors Robert R. Sears and Lee J. Cronbach, of Stanford, the executors of the Terman data archive. The data were at that time on Hollerith cards in a form which was not readable by a computer. Extensive data processing was undertaken by Susan Crayne under the direction of Arleen Leibowitz and myself. I am happy to express my indebtedness to these individuals.

Ms. Ann Barbee, of the Terman Project at Stanford, has also been most helpful with problems related to the data set. A 1972 follow-up questionnaire was also administered and will eventually be a part of the Terman data archive.

7. This is strictly true of the age at marriage variable only, but religious affiliation is not likely to be altered by experience in marriage and any changes in religious affiliation at the time of marriage and in behalf of the marriage may still be considered independent of subsequent marital success. The schooling levels are somewhat more troublesome since marriage prior to the completion of formal schooling is not unusual. We will assume that the level of schooling attained by 1940 for couples who married in the eight years prior to 1940 was determined prior to marriage.

A recent study by Davis and Bumpass (1976) indicates the extent of post-marriage schooling from the 1970 NFS data. They find that about 20 percent of white women married since 1950 have attended school since marriage for an average of about one year of schooling.

8. These studies of 4,000 and 13,000 observations respectively both used data obtained from surveying children about their parents' marital behavior. The studies also found that if both parents had no religious affiliation the divorce rate was higher still--about 17 or 18 percent.

9. The simple correlation between the subject's measured IQ and schooling level for the subsample of 114 women married between 1936 and 1939 was +0.12 and the simple correlation between the subject's self-assessed (in 1940) health level and schooling level was -0.15; the simple correlations between the subject's schooling level and the subject's father's and mother's schooling levels were +0.21 and +0.31, respectively, while the correlation between the parents' schooling levels themselves was +0.58 and between the subject and spouse, +0.33.

10. $\beta_i = \frac{\partial \ln(Pr/1-Pr)}{\partial Y_i} = \frac{1}{(Pr)(1-Pr)} b_i$.

11. The variable AGE MARRIED was coded "20" for women first married at or before age 20, and since the duration of time since first marriage by 1940 was calculated as age in 1940 minus AGE MARRIED, the duration was not known for those women with an age at marriage coded as 20 years. Since AGE MARRIED is one of the explanatory variables, this criterion for selection in the group somewhat restricts the range of that independent variable. More importantly, since marital instability is significantly greater for women married at younger ages, the criterion also constitutes some degree of conditioning the sample on the dependent variable. Consequently, throughout this section the empirical results should be understood as conditioned on an AGE MARRIED of 21 or above. For reference, among couples known (or estimated) to have first married one to four years prior to 1940, the divorce rate by 1960 for the 114 women studied was 15.8 percent, while for the 7 women married by age 20 the divorce rate was 28.6 percent. Similarly, among couples known (or estimated) to have first married five to eight years before 1940, the divorce rate by 1960 for the 97 women studied was 19.6 percent, while

for the 28 women married by age 20 the divorce rate was 53.6 percent. To compute these figures I assumed that those women married by age 20 were married at age 20 for purposes of defining the duration of their time at risk. If a woman in the latter group of 28 had been married at, say, age 16 instead of 20, she might have been first married 12 years before 1940 instead of, say, 8 years. It is the absence of that information which necessitates her exclusion from the group. Many of the regressions reported below were also run on the duration-specific groups, including these 7 and 28 women, assuming their age at marriage had been 20.

12. This phenomenon is in evidence, for example, in the 1970 U.S. Census data on age at marriage. For example, among white women first married between 1930-1934, the first marriage divorce rates fall rapidly from 33.0 percent to 25.5 to 17.6 as age at marriage rose from 14-17 to 18-19 to 20-24, and falls somewhat more to 13.8 percent at ages 25-29, then rises to 14.5 percent at age at marriage $\geq$ 30. This identical pattern is evidenced for every five-year cohort from 1920 through 1964 and for divorce rates as well as for divorce and separation rates! (See Census 1973, Table 4.) This pattern is one of the more persistent relationships in marital behavior; it is also observed, for example, in the SEO data. It is discussed at some length in Becker, Landes, and Michael (1976).

13. In his volume on predicting marital happiness, Terman mused "Many readers will smile at the optimism of a psychologist who assumes that any man and woman contemplating marriage will ever stay their intentions long enough to appeal for guidance to this modernized version

of the oracle" (Terman, 1938, p. 6). Neither Terman in his day, nor we, have succeeded in devising a useful prediction formula, but the evidence adduced here does suggest that there are understandable, systematic, and persistent effects of certain socioeconomic variables on divorce patterns.

14. See Heckman, Willis, 1975 or 1976, for discussions of the problems in longitudinal analyses of heterogeneous populations.

15. For instance, the wife's schooling level in Panel A raises the probability of divorce within the first one to four years of marriage by +0.003 and raises the probability of divorce within the first 11-14 years by 0.035, but raises the probability of divorce within the first 21-24 years by only 0.032.

16. These effects were calculated from the slope coefficients b_{ij} of Y_i in the jth year OLS regression in Table 2 as $b_{ij} \div n(1-p_j)^{n-1}$, where n = 2.5, 12.5 and 22.5 for the three regressions and p_j is calculated from $P_j = 1 - (1-p_j)^n$ where P_j is the sample mean of the DIVORCED 1940, DIVORCED 1950 and DIVORCED 1960 variables, respectively.

17. Weeks and Landis observed that the probability of divorce was particularly high for couples with both spouses expressing no religious affiliation. In his summary of evidence on marital dissolution, Levinger (1965) states that,"Like-faith marriages in which both members are either Catholic, Jews, or reasonably strict Protestants have the lowest probability of divorce . . . while . . . persons of unconventional religious convictions are most prone to use divorce as a solution to their marital problems" (p. 24). If the stabilizing influence of the same religion comes through greater complementarity in activities between spouses, then the particular religion should not matter so much as the fact of

similarity of religious beliefs and practices. Similarity of interests in the absence of what Ackerman (1963) calls "disjunctive affiliation networks" may be one of the important stabilizing influences on marriage.

18. The total effect of both spouses being Catholic is the sum of the three coefficients on the Catholic dummy variables. Or the partial effect of the wife being Catholic given that the other spouse is Catholic is the sum of the two coefficients on CATHOLIC, WIFE and BOTH CATHOLIC.

19. The scores were scaled from 0-100 and for these 109 observations the means (and standard deviations) for the subjects and their husbands were 64.2 (17.5) and 64.9 (15.3) respectively. The correlation across spouses was +.36 and the correlation with subsequent marital dissolution was quite high for the subjects: -.26 correlation of subjects' 1940 marital happiness score and a divorce dummy for 1950, -.25 correlation with a divorce dummy for 1960. The correlations were very weak for the husbands' scores and the divorce dummies: -.01 for 1950 and -.07 for 1960. These correlations for the subject suggest that the variable is indeed reflecting something related to marital satisfaction.

20. Several additional modifications of the regression analysis were also attempted. To the original set of five explanatory variables were added the age of the wife and the age of the husband, as well as an interaction term between these two variables. In another set of regressions the education levels of the spouses were interacted. In a further regression analysis a variable was added reflecting whether the subject had been widowed, and in a separate analysis the widows were deleted from the regressions. None of these modifications nor the results which

included the women married at or before age 20 seem to warrant attention here. The regression results for the five original variables were not substantially altered by these modifications.

21. Perhaps a hypothetical illustration would be useful. Suppose age at marriage raised the probability of divorce in the first year of marriage by thirty percentage points and had no effect on the probability in any subsequent year. Then if one estimates the effect of age at marriage on the probability of divorce on one-year intervals selected randomly from observations at all durations of marriage, the estimated coefficient will be a positive function of the number of observations that happen to have been selected from the first year of marriage. If the sample happened to have no observations from the first year of marriage the coefficient would be zero! Such a coefficient should not be interpreted as indicating no effect of the variable on the annual probability of divorce, and more strongly, should not be interpreted as indicating no effect on the probability over an extended period of time.

If Q is the probability of survival of the marriage through n periods and p the per-period probability of divorce, $Q = \prod_{i=1}^{n}(1 - p_i)$ and $\frac{\partial Q}{\partial X} = -\sum_{i=1}^{n} \frac{\partial p_i}{\partial X} \left(\prod_{j=1}^{n} (1 - p_j) \right) \quad j \neq i$ if the p's are independent; that is, $\partial Q/\partial X$ is a weighted average of the effect on each period's p_i. The random selection of observations by marriage duration would essentially weight the observations by the probabilities of survival up to that duration rather than up to the period n, so the sample selection does not yield an unbiased approximation to $\partial Q/\partial X$. Of course, if the p's are not independent of the level of X (e.g., nonlinear effects), the approximation to $\partial Q/\partial X$ is poorer still.

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