THE SURVEY OF INCOME AND PROGRAM PARTICIPATION

THE EFFECT OF THE MARRIAGE MARKET ON FIRST MARRIAGES EVEDENCE FROM SIPP

No. 108

John Fitzgerald
Department of Economics
Bowdoin College

U.S. Department of Commerce U.S. CENSUS BUREAU

SURVEY OF
INCOME AND
PROGRAM
PARTICIPATION

Working Paper Series

The Effect of the Marriage Market on First Marriages: Evidence from SIPP

No. 9003

John Fitzgerald
Department of Economics
Bowdoin College

June 1990

ACKNOWLEDGEMENTS

I appreciate the support of the Institute for Research on Poverty (IRP) and the Department of Health and Human Services (HHS) for this project. The views expressed are my own and not those of IRP and HHS. I would like to thank Steve Garelsky for helpful comments. I also want to thank Kirke Lawton and Hannah Payne for reliable research assistance, and Robert Moffitt for the use of some of his own data. The views expressed are the author's, and do not necessarily represent the views of the Bureau of the Census.

TABLE OF CONTENTS

The rise in the number of female-headed families in the U.S. has generated interest in the effects of the Aid to Families with Dependent Children program (AFDC) and other transfer programs on women's choices concerning marriage, childbearing, and employment. This paper looks at marriage rates by never married women using a discrete time hazard model allowing for left and right censoring. It addresses the question of how the marriage market and welfare policy affect marriage rates using an improved measure of spouse availability.

Concern over the availability of desirable spouses stems from evidence on the low rate of family formation among blacks. Bane and Ellwood (1983), O'Neill, et al. (1984), and Blank (1986) all report that black women have a much lower probability of leaving AFDC by marriage than whites. Wilson and Neckerman (1986) show that black women face a shrinking pool of "marriageable" employed black men. They suggest that the rise in black female headed families over recent decades is more closely linked with this diminishing pool of marriage partners than with expansion of transfer programs. Earlier work by Honig (1974) had suggested that unemployment and low male earnings significantly contributed to the formation of female-headed families. My study uses employment based sex ratios to test a Wilson and Neckerman-style hypothesis that low availability of "marriageable" men reduces marriage rate. Hypotheses are tested using data from the 1984 Panel of the Survey of Income and Program Participation (SIPP), although the small sample size of blacks who marry does not allow separate estimation by race.

I. PAST STUDIES

Work on marriage in economics has modelled the search for potential spouses to be much like the search for an acceptable job in the labor market. Keeley (1977) develops one such search model and derives implications for age at first marriage. Keeley (1979) extends the work and shows that sex ratios affect the proportion married using aggregated, cross-sectional data on states and SMSA's.

Hutchens (1979) also employs a search framework, and considers AFDC as a source of income while single. Increases in AFDC should cause a longer duration of marital search, since it reduces the gain to marriage for single female heads. He tests this hypothesis using data on individuals from the Panel Study of Income Dynamics and finds that AFDC reduces the probability of remarriage for female heads. In his study, the sex ratio has an insignificant effect, but the ratio used is very crude -- it is not disaggregated by race and includes both married and unmarried men and women. Further, Hutchens estimates the incidence of remarriage with a limited control for the length of time since divorce.

Demographers have stressed that crude sex ratios such as those employed by Hutchens are an inadequate measure of spouse

availability in the marriage market. Goldman, Westoff, and Hammerslough (1984) propose an improved measure of spouse availability that disaggregates by age group and race. They carefully calculate availability based on the age difference between spouses found in the population. These measures are shown to differ markedly from simple sex ratios. My paper uses disaggregated measures of spouse availability along these lines. The role of sex ratios is central to Guttentag and Secord (1983). They argue that low ratios of men to women result in a lack of commitment by men to the same partner -- hence higher divorce rates and lower marriage rates. Based on evidence from the U.S. in 1960 and 1970, Guttentag and Secord find support for their hypothesis. Espenshade (1985) extends their analysis into the 1970s and finds the argument is not persuasive: sex ratio imbalances during the 1970s were less than in the previous decade, yet the propensity to delay marriage and the rate of divorce both rose at a faster pace during the 1970s. One obvious problem with time-series analysis for questions of this type is that many other socioeconomic changes are simultaneously taking place. A study based on individual-level data can control more completely for these influences.

Regarding the role of welfare benefit levels on marriage, Espenshade (1985) presents a survey of the literature on the declining U.S. marriage rate and points out that the empirical evidence of the connection between AFDC and marriage rates is not strong. Hoffman and Duncan (1988) use a discrete choice model and find AFDC benefit levels have a small effect on remarriage rates. Moffitt (1988) finds, however, that higher levels of welfare benefits have negative effects on marriage (for both men and women) and increase female headship. The effect of benefits, however, is generally of marginal statistical significance particularly when regional dummies are included. He does not include sex ratios as an explanatory variable.

II. CONCEPTUAL FRAMEWORK

The marital search framework adopted here is an application of Becker (1973). A nonmarried woman searches for an acceptable spouse from an offer distribution of spouse quality. Spouse quality is a composite of demographic characteristics and income potential, including, presumably, future employment prospects. If the distribution of single-dimensional quality is known and has a finite mean, a woman adopts a "reservation quality" strategy, and accepts the first marriage offer from a person with quality exceeding her reservation quality level. This reservation quality model is more tractable than a matching model, and it allows to hypothesize the direction of the effects of key variables on search duration by considering their effects on the reservation spouse quality level, the offer distribution, and offer arrival rates.[1]

To make the model more clear, consider the following. In any short period, a woman receives a marriage offer with probability λ (the arrival rate). The offer represents a draw from a distribution F(q) where q is a index of spouse quality, (e.g. spouse wages). The woman has formulated a reservation quality q*. The probability that she accepts the offer is 1 - F(q*) and the resulting marriage rate is

$$h = \lambda(1-F(q^*))$$

where q* depends on personal characteristics and policy variables.

Improvements in spouse availability increase λ. Women may then raise their standards q*, and this can result in an increase or decrease in the rate of marriage. Increases in male income or employment improve F, the distribution of (quality) offers faced by a woman. This also causes a woman to choose a higher q* and again the marriage rate may either increase or decrease as a result.

The availability of AFDC benefits raises expected income while single relative to income while married, since married women are largely ineligible for AFDC[2]. This should raise q*, increase search duration, and result in higher quality (e.g. earnings) spouse. Women need not be eligible for this to occur, but the effect should be more pronounced for those who are eligible (i.e. mothers). Other welfare programs have a more ambiguous effect since they are also available to persons who are married. In the empirical work we separately analyze women with and without children to see if there is a difference in effect.

Higher education levels may also increase the woman's attractiveness as a mate, and improve the offer distribution. Further, it indicates higher potential wages and thus raises potential income while single and married. To the extent that the new spouse is expected to share in the wages or to the extent that the woman plans to reduce future labor supply in marriage, higher education would raise single income relative to married income, and result in a higher reservation quality and later marriage. Thus these two effects result in an ambiguous effect on duration, but a positive effect on spouse quality.

Children, particularly young children, raise search costs and may increase the taste for being married. They may also make the mother a less attractive marriage partner and worsen the offer distribution.

All of these results flow from a one-sided search model. The male's search decision is not developed but is implicit in the offer arrival rate and the relevant offer distribution. Consideration of a double search model is not pursued here since

it is unlikely to resolve current theoretical ambiguities, and raises new ones.

III. EMPIRICAL SPECIFICATION

As stated previously, the marriage hazard depends on personal characteristics and policy variables included welfare benefits and measures of the marriage. If q* depends on age -- or time -- the hazard will depend on age as well:

$$h(t) = \lambda(1-F(q^*(t))).$$

Unobserved heterogeneity will also cause the observed hazard to decline with age, and the usual caveats on interpretation of time dependence apply. Because of the nature of the SIPP survey which is my data source, I used 4 month interview periods as my unit of analysis.[3] Up to 9 periods (interviews) are available for each person. Given the time aggregated nature of the data I elect to employ a discrete hazard formulation.[4] The underlying hazard can be viewed as giving rise to continuous spells, but I only observe whether or not a marriage occurred in each of several intervals.

Let T_i denote the uncensored spell length corresponding to age at first marriage for person i. The hazard h(t) is the probability that a marriage occurs in interval t given no marriage prior to t. Thus:

$$h(t) = \text{Prob}(T_i = t \mid T_i \geq t).$$

The survivor function H(t) is the probability of no marriage to age t:

$$H(t) = \prod_{j=1}^{t-1} (1-h(j))$$

The data includes many incomplete spells where no marriage occurs during the observation period. If all spells were observed from their beginning (say age 15), then the problem is one of right censoring only. A completed spell contributes $\Pr(T_i = t_i) = h(t_i)H(t_i)$. A censored spell contributes $\Pr(T_i > t_i) = H(t_i)$ where t_i is the last interval in which the person is observed. Thus the likelihood becomes:

$$L = \prod_{i=1}^{n} [h(t_i)H(t_i)]^{1-\delta i} \quad [H(t_i+1)]^{\delta i}$$

$$\text{where } \delta_i = \begin{cases} 1 \text{ if spell is right censored} \\ 0 \text{ if completed by marriage} \end{cases}$$

Unfortunately, we do not have full data on all individuals beginning at age 15 or, more to the point, at the age that they enter the marriage market. Thus the data also suffers from left censoring: we have a sample of never married women taken at a point in time (wave 1 of SIPP) and subsequently followed up to three years. Covariates that change through time are not observed before entry into the sample. Using only the information available, we can still draw inferences on marriage rates conditional on age (and other covariates) at entry into the sample. Lancaster (1979) derives continuous time hazard models for data with left and right censoring. Below I present the discrete time analogs.

Let s_i denote the woman's age at sample entry -- that is interview one of SIPP. Then the likelihood conditional on age at entry becomes:

$$L = \prod_{i=1}^{n} \left(\frac{h(t_i)H(t_i)}{H(s_i)} \right)^{1-\delta i} \left(\frac{H(t_i+1)}{H(s_i)} \right)^{\delta i}$$

After some manipulation, the log likelihood can be expressed as

$$\log L = \sum_{i=1}^{n} \sum_{j=s_i}^{t_i} \{ y_{ij} \log \left(\frac{h(j)}{1-h(j)} \right) + \log(1-h(j)) \}$$

$$\text{where } y_{ij} = \begin{cases} 1 \text{ if marriage by person i in period j} \\ 0 \text{ otherwise} \end{cases}$$

The hazard is specified as a complementary log-log form which is appropriate for interval data when the underlying model is a continuous time proportional hazard model.[5]

$$h(t) = \exp[-\exp(\alpha(t) + \beta' X_i(t))]$$

The function $\alpha(t)$ will consist of two components: a function of age at sample entry (fixed for each person over time), and a set of dummies for duration in the sample after sample entry. This produces a semi-parametric stepwise underlying hazard. Conditional on age, the stepwise hazard shows the underlying effect on exit rates of time in sample, subject to the earlier caveat about heterogeneity.

IV. DATA FROM SIPP AND MARITAL TRANSITIONS

This study uses a sample of never-married females from the 1984 panel of (SIPP). The SIPP is a survey of 20,000 households that gathers monthly data by interviewing households every four months. Roughly half of the sample is interviewed nine times and

half eight times; some households are dropped after five or six interviews.[6] This study looks at the transition to married spouse present by women who were classified as never married in the first interview of the SIPP.[7] I used changes in marital status between interviews to define marriages; thus all transition rates refer to four month rates. The four month reference period allows for a close match between marital transitions and income changes. These women are all part of the nationally representative longitudinal sample, and were age 15 or older at the initial interview.

Table 1 shows sample counts and marriage rates by race. The counts show 4,793 women initially in the sample, 424 of whom marry. All those who missed at least one interview were treated as being censored as of that interview, even if they later reappear in the sample. The transition rates are four month rates that take into account the grouped nature of the data. (They are estimates of a constant exponential transition rate.)

The rates are presented by interview in panel B of Table 1 and show two things. A blip occurs in the marriage rate in interviews in the summer of each year.[8] The censoring rate reflects sample reductions that took place in SIPP in interviews five and six and reflect that half of the sample does not complete interview 9. The table also shows that whites have a marriage rate that is twice as high as blacks, and that censoring is greater among blacks.

Panel C of Table 1 shows four month transition rates classified by age at sample entry. Rates peak in the age 20-24 category as expected. The bottom panel shows marriage rates for 1984 from U.S. Vital Statistics for single (never married) women. Comparison shows that SIPP rates are somewhat low when they are put on an annual basis. Multiplying the SIPP four month rate by 3 gives a total rate of .051 compared to the vital statistics rate of .063. The difference could be explained by attrition if persons who miss at least one interview in SIPP are more likely to marry than those who remain.

Table 2 shows transitions for never married women who begin the sample with children. Surprisingly, these mothers have a marriage rate similar to the overall average.

Variable Definitions

This section describes the construction of selected variables that will be used subsequently. The SIPP identifies state of residence for 38 separate states -- the rest are grouped or were not sampled and only those in the separate states are included in the sample. The analysis below uses variation across states to estimate the effects of primary interest: welfare benefit levels and the marriage market. The measures of spouse availability,

described below, are assumed to approximate the marriage market conditions faced by women in each state. To the extent that there is substantial variation within each state, this variable is not disaggregated enough.

Table 3 shows the means and definitions of the explanatory variables. All dollar denominated variables are adjusted to January 1984 dollars by the monthly CPI. I used a comprehensive measure of a state's welfare benefits, TBEN, that is the total of the AFDC benefit maximum for a family of four plus the accompanying Food Stamp benefit plus the cash value of Medicaid.[9] A dummy indicates the presence of an AFDC-Unemployed Parent program, AFDCU, in the woman's state of residence. These variables are intended to capture the relevant components of a state's welfare package. However, they may also pick up the effects of other unobserved state specific attributes as noted by Ellwood and Bane (1985).

Measures of spouse availability include a sex ratio and male employment variables. SEXRATIO is the ratio of single males to single females of the same race and in a relevant age group by state of residence. The key assumption is that this ratio approximates the marriage partner availability of each woman in a particular state. The second marriage market measure is EMPMALE, the ratio of employed single males to single males, by age group, state, and race. This is in the spirit of Wilson and Neckerman's argument that the quality of potential spouses is important. The third, EMPFTMALE, is the ratio of full time employed single males to single males by age groups, state, and race, a more restrictive measure of potential spouse quality.

The single sex ratio is calculated from the 1980 decennial Census by race, state, and age group. Goldman, et. al. present evidence that there is a fairly large variation in age differences at marriage so I chose 11-year age groups. I assume that husbands are on average two years older than their wives, also based on Goldman, et al. Thus, for a woman aged 30, I computed the number of unmarried men of age 27 to 37 and divided it by the number of unmarried women age 25 to 35 to get SEXRATIO. This was done for each race, state, and woman's age between 18 and 54. These ratios were then associated with sample women by race, state, and age. The appendix provides details. The employment ratios EMPMALE and EMPFTMALE are computed from the 1980 Census, then updated to 1985 by multiplying them by an adjustment ratio to reflect changes in employment between 1980 and 1985.[10]

V. RESULTS

Two sets of results are presented. The first looks at a sample of never-married women who have children, whereas the second looks at all never-married women. The former group is expected to show stronger effects of welfare benefit availability since

they are potentially eligible for AFDC (without consideration of income).

Table 4 shows the results for women with children. Due to the relatively small sample and large number of parameters, these models include a constant and two time-in-sample dummies to capture the underlying hazard.[11] Model 1 uses a sample of women aged 15-56. Education is important and higher education levels raise marriage rates. As expected, blacks have significantly lower marriage rates. Advancing age has a negative effect on marriage rates. Of course, we must be careful in interpreting the age coefficient -- it likely proxies for unobserved personal characteristics (taste for singleness) that contribute to its negative sign at older ages. Higher levels of welfare benefits have a statistically significant negative effect on marriage rates, but the size of the coefficient is small.

To aid in interpreting the size of the coefficients, Table 6, shows simulations of the mean of the survivor function for this model assuming various changes in the mean level of characteristics.[12] The base case for the simulation is the mean of the survivor function at the first interview for women with children. The simulations show that age, race and education have large effects whereas TBEN has a small effect. The presence of a young child has a nontrivial positive effect on marriage rates, but its coefficient is not very well estimated (t-value = 1.53).

The marriage market variables have negative, poorly estimated coefficients, and their magnitudes are small. Since these are ratios computed from small state/race/age cells, we expect that measurement error contributes to the large standard errors. Controlling for the marriage market as measured here does not seem to eliminate racial differences -- race still has a significant effect.

The remaining coefficients including the unemployment rate and property income, are not statistically significant and are small in size. Model 2 in Table 4 shows the same model estimated on a sample that excludes women age 15-18. Age 19 was selected as a cutoff to eliminate the mechanical connection between age and education for those who graduate from high school.[13] The results are quite similar to Model 1 with relatively minor changes in the age coefficients. The benefit variable TBEN has the same size, and remains significant at the 10 percent level. The magnitudes of most coefficients are similar and the standard errors rise reflecting the smaller sample. The results appear robust to this change in the sample.

Table 5 presents results for the sample of all never married women, with or without children. This generalization of the sample allows us to look at the effect of having a child on marriage rates as well as provides us with a check on the

robustness of the marriage market results. These models include a constant plus seven time-in-sample dummies for the underlying stepwise hazard.[14]

The results of Model 3 for the age 15-56 sample again show the significant positive effect of education and negative effect of being black. Table 7 shows simulations for this model. Age at sample entry shows a positive effect to age 24 and a negative effect thereafter. Again, the negative effect could be due to unmeasured heterogeneity.

The presence of children has a significant and sizable positive effect on marriage rates. Holding all else constant, this suggests that the increased benefits of marriage for women with children or the increased cost of search outweighs any adverse effect on the offer distribution. The presence of a young child speeds marriage even more, although the effect is poorly estimated. Additional children have a negative impact on marriage rates, but the coefficient is statistically insignificant.

Turning to the policy and marriage market variables, we find that they are generally poorly estimated, i.e., not statistically different from zero at conventional levels. This statement applies to the benefits measure, TBEN, as well as the unemployment rate and the marriage market variables. The exception is the coefficient on AFDC-U which is negative and well estimated. To the extent that AFDC-U and TBEN together are proxying all aspects of a state's welfare system, the presence of an AFDC-U program could indicate other progressive characteristics of the state's welfare system that encourage welfare use and lead to lower marriage rates. The lack of statistical significance for TBEN, however, raises doubts about the importance of welfare benefits.

Model 4 uses the male full time employment ratio, EMPFTMALE, instead of EMPMALE. The EMPFTMALE might be a better indicator of availability high quality males or those males who are in the marriage market, but its coefficient is not significant. Compared to model 3, the other coefficients change very little and the log-likelihood falls by a small amount suggesting a worse fit. Model 5 imposes the cutoff at age 19, and again shows that the results are robust to this change.

The appendix tables A-3 and A-4 present further sensitivity tests. For these models cases were excluded where a marriage is reported but the survey respondent changed between interviews. This is an attempt to minimize misreporting. A large number of marriages were dropped on this basis, most likely including some legitimate ones, but the results are quite similar to those from the full sample. Thus I conclude that misreporting due to

respondent changes either occurs infrequently or is unimportant to the results.

VI. CONCLUSION

The SIPP provides a fairly large number of first marriages by women to work with, even though it has a short length for demographic events. Since blacks are not oversampled and have low marriage rates, the small number of observed marriages by blacks (35) make separate estimation by race unreliable -- work not presented here shows large standard errors.

The general results suggest that higher education levels and presence of children speed marriages, while advancing age slows them. This latter effect may be due to unobserved characteristics associated with older women who are never married.

Consistent with much of the literature, welfare benefits have a small impact. For a sample of never married women with children, total welfare benefit levels have a statistically significant effect, but is quite small in magnitude. For a sample of never married women with or without children, a dummy for AFDC-U programs has a significant negative effect on marriage. It may be proxying other attributes of the welfare system in the more "progressive" states.

Marriage market variables also have small, statistically insignificant effects. After controlling for sex ratio and employment ratio by males, being black still has a significant negative effect on marriages. This evidence casts doubt on the Wilson and Neckerman hypothesis that spouse availability is a key to rising female headship among blacks.

APPENDIX: COMPUTING MARRIAGE MARKET VARIABLES

To compute SEXRATIO from the 1980 Census I used the 1 percent sample for whites and the 5 percent sample for blacks. I included only noninstitutionalized civilians. For each state and race I computed the ratio of unmarried males to unmarried females by 11 year age groups as follows. For a woman age X, I divided the number of unmarried men age X-3 to X+7 by the number of unmarried women age X-5 to X+5. My census extract only included unmarried persons aged 18 to 54, so I adjusted the size of the groups at the endpoints to keep the same number of years for men and women. For example, for women age 18 the ratio is unmarried men age 20-25 divided by unmarried women age 18-23. For women age 19, the ratio is unmarried men age 20-26 divided by unmarried women age 18-24. Thus groups near the endpoints are less than 11 years, while groups in the middle (woman's age 23 to 47) are 11 year groups. These ratios were then assigned to women based on age, state, and race. Women younger than 18 were given the 18 ratio while women older than 54 were given the 54 ratio.

The employment ratios were computed using the same groups from the 1980 Census, then updated as follows. Let EMPSINGLE80 denote the ratio of employed single males to single males for a particular state, race, and age cell from the 1980 Census. To compute our EMPMALE, we adjust this as follows:

$$\text{EMPMALE} = \text{EMPSINGLE80} \cdot \frac{\text{EMPCPS85}}{\text{EMPCPS80}}$$

where EMPCPS85 is the employment ratios for all men (regardless of marital status) computed by the same state, race, and age cells from the 1985 CPS. EMPCPS80 is computed similarly from the 1980 CPS. Thus we adjust the single employment ratio by a quotient reflecting the change in employment of the total male population. The state, race, and age cells are too small to use the CPS to directly calculate these measures for single persons.

FOOTNOTES

[1]Montgomery and Trussell (1986, pp. 231-240) present a summary of marital search models and Hutchens (1979) develops a model.

[2]Some states have an AFDC-Unemployed parent program that provides aid to couples with the husband unemployed. This would partly offset the marriage effect, but AFDC-U has strict eligibility rules and was not available in all states during the sample period.

[3]This was done to avoid the "seam" problem in SIPP where transitions are reported to occur more frequently between interview periods than within interview periods.

[4]Allison (1982) discusses the estimation of discrete time hazard models.

[5]See Prentice and Gloeckler (1978) and Allison (1982).

[6]In waves five and six of SIPP, the Bureau of the Census reduced the sample size by about 15 percent as a cost saving measure.

[7]Appendix Table A-1 shows reported transitions for every person reporting a marital transition in SIPP, excluding those who drop out of the sample and then return with a new status. Some transitions are obviously misreported: the transition from widowed to never married for example. One explanation is that SIPP uses self reported marital status and accepts reports from proxies if a person is unavailable. Thus a change in respondents could generate a marital transition change. To guard against this possibility for marriages by never married females, I later report a set of results for a sample with all cases excluded where the respondent changed at the time of the marital transition. This exclusion obviously eliminates many valid marriages, but the results are not sensitive to the exclusion.

[8]These blips suggest that the actual marriage date is somewhat arbitrary. Ideally I would like to use the date that the couple commits to share financial resources and for that the actual marriage date is relevant.

[9]The TBEN sums 70 percent of the AFDC guarantee, the Food Stamp guarantee, plus 36.8 percent of the insurance value of Medicaid. Only 70 percent of the AFDC guarantee is used since Food Stamp benefits are reduced by 30 percent of the AFDC benefit. Smeeding (1982) estimated 36.8 percent as the conversion to the cash equivalent value of Medicaid. These data were provided to me by Robert Moffitt and are discussed more fully in Moffitt (1988). The results are little changed if one uses the AFDC maximum benefit for a family of four instead of TBEN.

[10]Using the ratios from the 1980 Census directly does not alter the results, although the standard errors on these coefficients in the hazard models become somewhat smaller.

[11]Table A-2 shows the coefficients for the time dummies.

[12]This method computes the estimated survivor function for each person and takes the mean across people. To simulate a change all person's variables are adjusted and a new mean survivor function is computed.

[13]In addition there is no simple, reliable way in the 1984 SIPP Panel to tell if a 15-18 year old is currently in school.

[14]See Table A-2.

REFERENCES

Allison, Paul. "Discrete-time Methods for the Analysis of Event Histories." In Samuel Leinhart (ed.), **Sociological Methodology** (San Francisco: Jossey-Bass Publishers, 1982):61-98.

Bane, Mary Jo, and David Ellwood. "The Dynamics of Dependence: The Routes to Self-Sufficiency." Report prepared by Urban Systems Research and Engineering, Inc., for the U.S. Department of Health and Human Services (1983).

Becker, Gary. "A Theory of Marriage: Part I." **Journal of Political Economy** 81 (July/August 1973):813-846; "Part II." **Journal of Political Economy** 82 (March/April 1974):s11-s26.

Blank, Rebecca. "How Important Is Welfare Dependence?" Institute for Research on Poverty Discussion Paper 821-86 (1986).

Ellwood, David, and Mary Jo Bane. "The Impact of AFDC on Family Structure and Living Arrangement." In R. Ehrenberg (ed.) **Research in Labor Economics**, Vol. 7 (Greenwich, CT: JAI Press, 1985).

Espenshade, Thomas J. "Marriage Trends in America: Estimates, Implications, and Underlying Causes." **Population and Development Review**, 11 (June 1985):193-245.

Goldman, Noreen, Charles F. Westoff, and Charles Hammerslough. "Demography of Marriage Market in the United States." **Population Index**, 50 (Spring 1984):5-25.

Guttentag, Marcia, and Paul Secord. **Too Many Women? The Sex Ratio Question** (Beverly Hills: Sage Publications, 1983).

Hoffman, Saul, and Greg Duncan. "A Comparison of Choice-Based Multinational and Nested Logit Models: The Family Structure and Welfare Use Decisions of Divorced or Separated Women." **Journal of Human Resources**, XXIII (Fall 1988):550-562.

Honig, Marjorie. "AFDC Income Recipient Rates, and Family Dissolution." **Journal of Human Resources**, 9 (1974):303-322.

Hutchens, Robert M. "Welfare, Remarriage, and Marital Search." **American Economic Review**, 69 (June 1979):369-379.

Keeley, Michael. "The Economics of Family Formation." **Economic Inquiry**, 15 (April 1977): 238-250.

Keeley, Michael. "An Analysis of Age Pattern of First Marriage." **International Economic Review**, 20 (June 1979): 527-544.

Lancaster, Tony. "Econometric Methods for the Duration of Unemployment." **Econometrica**, 47 (July 1979): 939-956.

Moffitt, Robert. "The Effect of the U.S. Welfare System on Marital Status." Presented at the University of Chicago Conference on Family Formation and Welfare, October 1988.

Montgromery, Mark, and James Trussell. "Models of Marital Status and Childbearing." **Handbook of Labor Economics**, 1, edited by O. Ashenfelter and R. Layard, 1986.

O'Neill, June A., Douglas Wolf, Laurie Bassi, and Michael Hannan. "An Analysis of Time on Welfare." Report prepared by the Urban Institute for the U.S. Department of Health and Human Services (June 1984).

Prentice, R. L. and L. A. Gloeckler. "Regression Analysis of Grouped Survival Data with Application to Breast Cancer Data." **Biometrics**, 34: 57-67.

Smeeding, Tim. "Alternative Methods for Valuing In-Kind Transfer Benefit and Measuring Their Effect on Poverty." Technical Paper 50. Washington, DC: U.S. Bureau of the Census.

Wilson, William, Julius, and Kathryn Neckerman. "Poverty and Family Structure: The Widening Gap Between Evidence and Public Policy Issues." In Sheldon Danziger and Daniel Weinberg (eds.), **Fighting Poverty: What Works and What Doesn't** (Cambridge, MA: Harvard University Press, 1986):232-259.

Table 1

Marriage Rates for Never Married Women Age 15 and Over*

Panel A: Sample Counts

	All Persons	Whites	Blacks
Number who marry	424	378	36
Total sample	4,793	3,771	885

Panel B: Four Month Transition Rates (Constant Rate)

	Interview No.	All Persons	White	Blacks
Total marriage rate (All interviews)**		.0169	.0190	.00793
Marriage rate by interview number	2	.0129	.0130	.00833
	3	.0239	.0281	.00920
	4	.0215	.0232	.01150
	5	.0109	.0119	.00835
	6	.0199	.0237	.00403
	7	.0185	.0218	.00676
	8	.0120	.0134	.00726
	9	.0112	.0133	.00361
Censoring Rate by interview number	2	.0770	.0725	.0964
	3	.0721	.0685	.0841
	4	.0604	.0580	.0658
	5	.2050	.1970	.2270
	6	.1170	.1150	.1310
	7	.0564	.0506	.0834
	8	.0303	.0290	.0435
	9	.7510	.7470	.8020

Panel C: Sample Counts and Four Month Marriage Rates by Age at Sample Entry

Age	15-17	18-19	20-24	25-34	35+
Number who marry	27	77	160	154	6
Total Marriage Rate** (All interviews)	.0139	.0162	.0224	.0220	.0014

Panel D: Annual Marriage Rates from U.S. Vital Statistics 1984 (Note: Rates above are four month rates.)

Age	15 or over	18-19	20-24	25-44	45-64	65+
Marriage rate	.0635	.0721	.104	.0805	.0083	.0008

*Notes: Data from SIPP. Age taken at Sample Entry (Wave 1).
**Assumes equal, constant rate in each period.

Table 2

Marriage Rates for Never Married Women with Children, Age 15 and Over

A. Counts

Number who marry	40
Total	464

B. Four Month Marriage Rates

Total Marriage Rate (all interviews) .0164

By interview

Interview	Marriage Rate	Censoring Rate
2	.01580	.0720
3	.01970	.0740
4	.02420	.0537
5	.00926	.1950
6	.00737	.1400
7	.01630	.0367
8	.02630	.0656
9	.00688	.8670

Notes: Data from 1984 Panel of SIPP. Age taken at sample entry. Total rate assumes a constant, equal rate in each period.

Table 3

Never Married Women Age 15 to 56
Means at First Interview

Variable	Description	Mean: With or Without Children	Mean: With Children
EDUC12	Dummy = 1 if high school graduate	.228	.365
HIEDUC	Dummy = 1 if completed some post secondary school	.411	.203
PROPERTY INCOME	Woman's Property Income (Rents, Interest, Dividend, Asset Income)	51.9	7.7
NKIDS	Number of Children	.180	1.15
YKID	Dummy = 1 if child under 6	.0853	.547
AGE	Age at entry into sample	23.5	25.4
RACE	Dummy = 1 if black	.208	.562
AFDC4MAX	AFDC guarantee for family of four, by state	386	385
AFDC U	Dummy = 1 if state of residence has AFDC-U unemployment parent program	.631	.639
TBEN	Measure of total welfare package for of 4 including AFDC, foodstamps and cash value of Medicaid, by state	609	609
UNEMP	Monthly state unemployment rate in percent	8.26	8.35
SEXRATIO	Single Male/Single Female by race, age, state	.966	.896
	Whites	.998	.998
	Blacks	.844	.814
EMPMALE	Proportion of single males who are employed by race, age, state	.702	.656
	Whites	.740	.749
	Blacks	.560	.584
EMPFTMALE	Proportion of single males who are employed full time by race, age, state	.409	.395
	Whites	.433	.454
	Blacks	.319	.349
MARRY	Dummy = 1 if marry	.118	.174
	Whites	.137	.290
	Blacks	.0512	.0833
Sample Size		3283	512

NOTES: Data from SIPP. Excludes women in grouped SIPP states or with missing age or education.

Table 4

Marriage Hazard Rates for Single Women with Children

Complementary log log hazard with time dummies.[a]

	Age 15-56 Model 1	Age 19-56 Model 2
EDUC12	1.06**	1.21**
	(.348)	(.418)
HIEDUC	2.22**	2.32**
	(.355)	(.435)
PROPERTY INCOME (in 1,000s)	-1.76	-1.92
	(9.31)	(9.89)
NKIDS	.156	.162
	(.246)	(.255)
YKID	.580	.210
	(.380)	(.399)
RACE (Black = 1)	-1.75**	-1.44**
	(.417)	(.455)
AFDC U	-.131	-.0684
	(.272)	(.330)
SEXRATIO	.125	-.280
	(.569)	(.876)
EMPMALE	-.955	-.106
	(1.62)	(1.77)
UNEMP (in percent)	.0519	.0511
	(.0606)	(.0704)
AGE 1 (≤ 24 spline)	-.252**	-.175
	(.0652)	(.0930)
AGE 2 (> 24 spline)	-.109	-.159*
	(.0589)	(.0628)
TBEN (in 1,000s)	-3.63*	-3.80
	(1.76)	(2.14)
LOG OF LIKELIHOOD FUNCTION	-347.5	-282.5
SAMPLE SIZE:		
Persons	512	452
Person inteviews	2,705	2,439

NOTES: SIPP data on blacks and whites. Excludes women in grouped SIPP states or with missing age or education data. Standard errors in parentheses. Starred coefficients are significantly different from zero at a 5 percent significance level (*) or 1 percent (**).

[a]Two time dummies and a constant were included. See Table A-2.

Table 5
Marriage Hazard Rates for Single Women
Complementary log log hazard with time dummies[a]

	Age 15-56 Model 3	Age 15-56 Model 4	Age 19-56 Model 5
EDUC12	1.07**	1.08**	.974**
	(.177)	(.177)	(.204)
HIEDUC	.977**	.981**	+.831**
	(.181)	(.181)	(.202)
PROPERTY INCOME (in 1,000s)	-.242	-.247	-.271
	(.274)	(.274)	(.282)
NKIDS	-.399	-.395	-.275
	(.255)	(.254)	(.262)
YKID	.398	.411	.171
	(.351)	(.352)	(.361)
NKID (dummy for nkids > 0)	1.28**	1.27**	.949*
	(.425)	(.423)	(.434)
RACE (Black = 1)	-1.66**	-1.48**	-1.38**
	(.260)	(.225)	(.267)
AFDC U	-.372**	-.359*	-.358*
	(.141)	(.142)	(.153)
SEXRATIO	.0341	.00783	-.187
	(.310)	(.312)	(.359)
EMPMALE	-1.34		-1.04
	(.822)	--	(.866)
EMPFTMALE	--	-.596	--
		(.772)	
UNEMP (in percent)	.0471	.0548	.0431
	(.0314)	(.0326)	(.0339)
AGE 1 (≤ 24 spline)	.0218	.0173	.0482
	(.0334)	(.0357)	(.0395)
AGE 2 (> 24 spline)	-.0747**	-.0725**	-.0858**
	(.0194)	(.0205)	(.0201)
TBEN (in 1,000s)	-1.18	-1.17	-.843
	(.823)	(.830)	(.891)
LOG OF LIKELIHOOD FUNCTION	-1752	-1753	-1532
SAMPLE SIZE:			
Persons	3.283	2,283	2,556
Person inteviews	16,564	16,564	13,276

NOTES: SIPP data on blacks and whites. Excludes women in grouped SIPP states or with missing age or education data. Standard errors in parentheses. Starred coefficients are significantly different from zero at a 5 percent significance level (*) or 1 percent (**).

[a]Seven time dummies and a constant were included. See Table A-2.

Table 6

Survivor Function Simulations

Never Married Women with Children, Age 15-56

	Proportion Remaining Unmarried at:		
	1 Year	2 Years	3 Years
1. Base Case (at means)	.94	.87	.79
2. Age = 20	.93	.84	.72
3. Age = 30	.99	.97	.94
4. NKIDS = 1 (YKID = 1)	.96	.91	.85
5. NKIDS = 0 (YKID = 0)	.98	.95	.91
6. TBEN increased 10%	.95	.89	.82
7. AFDC U = 0	.97	.93	.87
8. AFDC U = 1	.97	.94	.88
9. UNEMP increased 10%	.97	.93	.87
10. SEXRATIO increased 10%	.94	.87	.79
11. EMPMALE increased 10%	.94	.88	.80
12. Prop Inc increased 10%	.97	.93	.88
13. Ed < 12	.99	.97	.94
14. Ed = 12	.96	.92	.85
15. Ed > 12	.88	.76	.59
16. Race = 1 (Black)	.98	.95	.90
17. Race = 0 (White)	.88	.76	.63

Notes: Uses coefficients from Model 1 of Table 4. Mean of Survivor Functions.

Table 7

Survivor Function Simulations

Never Married Women with or without Children, Age 15-56

	Proportion Remaining Unmarried at:		
	1 Year	2 Years	3 Years
1. Base Case (at means)	.96	.91	.85
2. Age = 20	.96	.90	.84
3. Age = 30	.97	.92	.87
4. NKIDS = 1 (YKID = 1)	.93	.83	.74
5. NKIDS = 0 (YKID = 0)	.97	.91	.86
6. TBEN increased 10%	.96	.91	.86
7. AFDC U = 0	.95	.89	.82
8. AFDC U = 1	.97	.92	.87
9. UNEMP increased 10%	.96	.91	.85
10. SEXRATIO increased 10%	.96	.91	.86
11. EMPMALE increased 10%	.97	.92	.86
12. Prop Inc increased 10%	.96	.91	.85
13. Ed < 12	.98	.95	.92
14. Ed = 12	.94	.87	.79
15. Ed > 12	.95	.89	.82
16. Race = 1 (Black)	.99	.97	.95
17. Race - 0 (White)	.95	.88	.81

Notes: Uses coefficients from Model 3 of Table 5.

Table A-1

Marital Status Transitions in SIPP by Interview

Cases with transition and with no missing interviews Prior to Transition

Initial Marital Status	Transition To: Never Married	Separated	Divorced	Widowed	Married Spouse Absent	Married Spouse Present
Never Married	--	38	48	19	69	1,067
Separated	51	--	517	30	30	246
Divorced	40	50	--	41	24	499
Widowed	20	9	44	--	11	70
Married Spouse Absent	21	80	32	35	--	135
Married Spouse Present	60	892	275	403	184	--

Notes: 1984 Panel of SIPP. Table excludes cases where a person dropped out of the sample and then returned with a new status.

Table A-2

Time in Sample Dummy Coefficients for Models in Tables 3 and 4

Marriage Hazards for Single Women Age 15 to 56

Definition: $T_j = 1$ if spell ended in interview j

A.	Model 1
Constant	3.42
	(2.03)
T = 4, 5, 6	.249
	(.258)
T = 7, 8, 9,	.687*
	(.312)

B.	Model 3
Constant	-4.36**
	(.941)
T3	1.44**
	(.176)
T4	1.30**
	(.189)
T5	.587*
	(.230)
T6	1.24*
	(.211)
T7	1.47**
	(.213)
T8	1.18**
	(2.40)
T9	.744*
	(2.91)

Notes: Starred coefficients are significantly different from zero at 5 percent significance level (*) or 1 percent (**). Standard Errors in parentheses.

Table A-3

Marriage Rates for Single Women with Children
No Change in Survey Respondent After Marriage

Complementary log log hazard with time dummies.[a]

	Age 15-56	Age 19-56
EDUC12	1.28**	1.19*
	(.450)	(.513)
HIEDUC	2.30**	2.20**
	(.439)	(.520)
PROPERTY INCOME (in 1,000s)	-2.88	-2.98
	(10.8)	(11.4)
NKIDS	.208	.181
	(.281)	(.292)
YKID	.168	-.0417
	(.506)	(.547)
RACE (Black = 1)	-1.86**	-1.54**
	(.498)	(.545)
AFDC U	-.0876	-.0268
	(.336)	(.388)
SEXRATIO	-.00106	-.200
	(.718)	(1.04)
EMPMALE	-1.28	-.416
	(1.85)	(2.06)
UNEMP (in percent)	.0294	.0671
	(.0828)	(.0935)
AGE 1 ($\leq$ 24 spline)	-.206*	-1.38
	(.0844)	(.116)
AGE 2 ($>$ 24 spline)	-.113	-.149*
	(.0693)	(.0731)
TBEN (in 1,000s)	-5.68*	-5.24
	(2.37)	(2.81)
LOG OF LIKELIHOOD FUNCTION	-252.7	-220.0
SAMPLE SIZE:		
Persons	475	428
Person inteviews	2,551	2,328

NOTES: SIPP data on blacks and whites. Excludes women in grouped SIPP states or with missing age or education data. Standard errors in parentheses. Starred coefficients are significantly different from zero at a 5 percent significance level (*) or 1 percent (**).

[a]Two time dummies and a constant were included.

Table A-4
Marriage Rates for Single Women:
No Change in Survey Respondent After Marriage
Complementary log log hazard with time dummies.[a]

	Age 15-56	Age 19-56
EDUC12	1.20**	1.02**
	(.225)	(.260)
HIEDUC	1.14**	.951**
	(.227)	(.259)
PROPERTY INCOME (in 1,000s)	-.251	-.224
	(.294)	(.296)
NKIDS	-.165	-.111
	(.278)	(.286)
YKID	.459	.310
	(.436)	(.445)
NKID (dummy for NKIDS > 0)	.869	.661
	(.509)	(.521)
RACE (Black = 1)	-1.51**	-1.26**
	(.303)	(.308)
AFDC U	-.336	-.321
	(.184)	(.198)
SEXRATIO	.167	.0431
	(.374)	(.452)
EMPMALE	-1.32	-.975
	(.979)	(1.01)
UNEMP (in percent)	.0561	.0576
	(.0404)	(.0433)
AGE 1 (≤ 24 spline)	.0568	.0846
	(.0414)	(.0494)
AGE 2 (> 24 spline)	-.0574**	-.0654**
	(.0211)	(.0220)
TBEN (in 1,000s)	-1.58	-1.22
	(1.02)	(1.11)
LOG OF LIKELIHOOD FUNCTION	-1221	-1097
SAMPLE SIZE:		
Persons	3,074	2,383
Person inteviews	15,656	12,504

NOTES: SIPP data on blacks and whites. Excludes women in grouped SIPP states or with missing age or education data. Standard errors in parentheses. Starred coefficients are significantly different from zero at a 5 percent significance level (*) or 1 percent (**).

[a]Seven time dummies and a constant were included.

UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

OFFICE OF THE DIRECTOR

September 29, 1989

Dr. John Fitzgerald
Department of Economics
Bowdoin College
Brunswick, ME 04011

Dear John,

Thanks for sending me your revised 1988 AEA paper, **"The Effect of Marriage Market on First Marriages: Evidence from SIPP."** I would like to circulate the paper as a SIPP Working Paper. May I? Call me at 301-763-8328 if it's OK.

If I can circulate it as a Working Paper, could you send me a copy of the disc (in DOS or ASCII). Thanks.

Sincerely,

Dan

301-725-3593

DANIEL KASPRZYK
Chief, SIPP Research and
Coordination Staff
Office of the Director

Cecil John

R, Connelly ← local area info to persons w SIPP

Can I get a Disc (The tables are Light)

OK for Working Paper

✓ - waiting for Revision cecil (11/15)

BOWDOIN COLLEGE

DEPARTMENT OF ECONOMICS BRUNSWICK, MAINE 04011

December 19, 1989

Dan Kasprzyk
Office of the Director
Bureau of the Census, SHEP Suite 2a
Washington D.C. 20233

Dear Dan,

At long last here is my revised "The Effect of the Marriage Market on First Marriages: Evidence from SIPP" paper for inclusion as a SIPP working paper. A disk is enclosed containing an ascii copy; I hope it is useful. Our secretary can try to write a different ascii file with other characteristics if it would be more helpful.

Sorry for the delay, but it has been a hectic semester.

Sincerely,

John Fitzgerald

John Fitzgerald

P.S. I will likely put in an ASA fellowship application but it is not ready yet.

The Effect of the Marriage Market on First Marriages: Evidence from SIPP

John Fitzgerald
Department of Economics
Bowdoin College
Brunswick, ME 04011

Revised November 1989

Original October 1988

I appreciate the support of the Institute for Research on Poverty and the Department of Health and Human Services for this project. The views expressed are my own and not the those of IRP or HHS. I would like to thank Steve Garelsky for helpful comments. I also want to thank Kirke Lawton and Hannah Payne for reliable research assistance, and Robert Moffitt for the use of some of his own data.