Poverty and Choice of Marital Status: A Self-Selection Model

by

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ABSTRACT

Over the last few decades in the United States, the poverty rate for female-headed families has been about five times the poverty rate for other family types. This paper addresses the question of why, in general, female-headed families are so much poorer than other families. Recognizing that individuals choose their own marital status, a self-selection model is used to identify the factors which determine the poverty rates for married-couple families, families headed by females with no husband present, and families headed by males with no wife present. The following control variables are found to be important determinants of poverty for all three family types: education of family members; age, race, disability, and unemployment of the family head; geographical location, size and composition of the family. Both married-couple families and male-headed families are found to be less poor than female-headed families mainly because the marginal effects of the control variables, and to a lesser extent the mean levels of the control variables, favor the former two types of families over female-headed families.

1. INTRODUCTION

In 1989, the poverty rate in the United States was 12.8 percent, the same as it was in 1968 (see column 1 of Table 1). Although poverty fell steadily throughout the 1960s, by 1973 it had reached a low of 11.1 percent after which it began to increase, particularly rapidly in the early 1980s. By 1983, 15.2 percent of the population was below the poverty line. The remainder of the 1980s saw a declining poverty rate, but only back to levels which had prevailed in the late 1960s. The poverty rates for people living in families headed by a female with no husband present (see column 2 of Table 1), and for people living in other types of families (see column 3 of Table 1), have been highly correlated with the overall poverty rate, although none has shown a consistent trend over the last three decades. In contrast, poverty among unrelated individuals has shown a consistent downward trend, from 46.1 percent in 1959 to 19.2 percent in 1989 (see column 4 of Table 1).[1] Perhaps the most striking feature of Table 1, however, is the fact that the poverty rate for those in female-headed families has consistently been almost three times the overall poverty rate, and almost five times the poverty rate for people living in other family types.

This paper addresses the following question: why is the poverty rate for female-headed families so much higher than that of other families? The method of analysis is to identify the factors which determine the poverty rates for various family types and thereby isolate the characteristics of "family type" which are associated with poverty. Intuitively, family type would appear to be important in explaining poverty for reasons such as the following:

(1) Married-couple families can better take advantage of economies of scale in the purchase of housing and other goods than can families headed by a single

adult. (2) Compared with families headed by a single adult, married-couple families are less likely to be forced into poverty if the head of the family is laid off or is unable to work because of illness or injury. Both these explanations stress the effects on poverty of the number of adults in the family. (3) To the extent that sexual discrimination exists in the workplace, female-headed families are more likely to be poor than male-headed families. On the other hand, factors unrelated to family type undoubtedly affect the poverty levels of families. It may be that, in general, single adults who head families possess personal characteristics (such as low levels of human capital) which make it likely that they would be poor even if they lived in married-couple families. If so, society's resources would be better allocated towards modifying those personal characteristics (for example, increasing the human capital of poor persons) rather than encouraging individuals to live in traditional family units.

Section 2 describes the model used to analyze the relationship between the type of family in which a person resides and the likelihood of him or her being poor. The model is used to decompose poverty status differentials between various pairs of family types. The decompositions illuminate the issue of high poverty rates for people in female-headed families. Section 3 describes the data used to estimate the model. Sections 4 and 5 report the results. Concluding comments are offered in Section 6.

2. THE MODEL

Poverty status of a family of a given type is modelled as a linear function of a set of control variables. If poverty is independent of family type then

the coefficients of the model will be the same across family types and differences in mean poverty levels of different family types will be due to differences in the mean levels of the control variables. Conversely, if poverty is related to family type then at least one coefficient will differ across family types.

Three types of family are considered: married-couple families (with or without children), male-headed families (that is, families headed by a male with no wife present), and female-headed families (that is, families headed by a female with no husband present). The sampling unit is the family, or equivalently the head of the family. Since individuals choose their own marital status, least squares estimates of the coefficients of the model are likely to be subject to self-selection bias. Therefore, the relationship between poverty and family type needs to be supplemented with a selection equation which explains whether or not the head of the family is married.

Each family head is assumed to choose his or her marital status according to the utility generated in each marital state. It is assumed that the family head is single if the utility from being single, U^S, exceeds the utility from being married, U^M. Otherwise the family head is married. Let $I^* = U^S - U^M$ be the utility differential for a given family head. It is assumed that I^* is a function of the characteristics of the family head, Z_1, Z_2, ... Z_J, as well as the poverty status differential, $Y^S - Y^M$, between the two marital states. Although I^* is unobserved, $I^* > 0$ implies that the family head is single, in which case I is set equal to 1. $I^* \leq 0$ implies that the family head is married and I is set equal to 0. The poverty status of the family head if single, Y^S, and the poverty status of the family head if married, Y^M, are both assumed to be

functions of a set of control variables, $X_1, X_2, \ldots X_k$. For each family head X_j (j=1,2,...,k), Z_j (j=1,2,...J) and I are observed, as is the limited dependent variable Y^S or Y^M. That is, we observe Y^S if I = 1 and Y^M if I = 0, but we never observe both Y^S and Y^M for the same family head.

The selection equation in the model has the form:

Selection Equation

$$(1) \qquad I^* = \sum_{j=1}^{J} \beta_j Z_j + \beta_0 (Y^S - Y^M) + u$$

and $I = 1$ if $I^* > 0$, while $I = 0$ if $I^* \leq 0$.

The regression equations in the model have the form:

Regression Equations

$$(2) \qquad Y^M = \beta^M_0 + \sum_{j=1}^{k} \beta^M_j X_j + u^M \qquad \text{if } I = 0$$

$$(3) \qquad Y^S = \beta^S_0 + \sum_{j=1}^{k} \beta^S_j X_j + \beta^D_0 D + \sum_{j=1}^{k} \beta^D_j D X_j + u^S \qquad \text{if } I = 1$$

where D is a dummy variable, equal to 1 if the head of the family is female and zero if the head of the family is male; β_j (j=0,1,2,...,J), and β^M_j, β^S_j, β^D_j (j=0,1,2,...,k) are parameters; u, u^M and u^S are random residuals which are assumed to be N(0,1), $N(0,\sigma_M^2)$ and $N(0,\sigma_S^2)$ respectively; u^M and u have correlation ρ_M; and u^S and u have correlation ρ_S.

Ordinary least squares estimates of the parameters in equations (2) and (3) are inconsistent since

$$(4) \qquad E(u^M \mid I=0) = \gamma^M \lambda^M(\psi) \neq 0, \quad \text{and}$$

(5) $E(u^S \mid I=1) = \gamma^S \lambda^S(\psi) \neq 0$

where

(6) $\lambda^M(\psi) = -\phi(\psi) / [1 - \Phi(\psi)]$

(7) $\lambda^S(\psi) = \phi(\psi) / \Phi(\psi)$

(8) $\psi = \sum_{j=1}^{J} \beta_j Z_j + \beta_0(Y^M - Y^S)$

ϕ and Φ being the standard normal density function and cumulative normal density function, respectively.

A two-stage estimation procedure gives consistent estimates of the parameters of the model (Maddala, 1983, pp.223-228). The first stage is to estimate the reduced form of the selection equation as a probit model. The reduced form is:

(9) $I^* = \sum_{j=1}^{K} \delta_j W_j + v$

where W_j (j=1,2,...,K) are the variables included in X_j (j=1,2,...,k), or Z_j (j=1,2,...,J), or both; δ_j (j=1,2,...,K) are parameters; and v is a random residual which is assumed to be $N(0,\sigma_v^2)$. This gives consistent estimates, $\delta_j^{\#}$ (j=1,2,...,K), which can be used to compute $\psi^{\#} = \Sigma \delta_j^{\#} W_j$, $\lambda^M(\psi^{\#})$ and $\lambda^S(\psi^{\#})$.

The second stage of the estimation procedure is to apply ordinary least squares to regression equations which have been corrected for self-selection bias:

(10) $Y^M = \beta^M_0 + \sum_{j=1}^{k} \beta^M_j X_j + \gamma^M \lambda^M(\psi^{\#}) + \epsilon^M$ if I = 0

(11) $Y^S = \beta^S_0 + \sum_{j=1}^{k} \beta^S_j X_j + \beta^D_0 D + \sum_{j=1}^{k} \beta^D_j D X_j + \gamma^S \lambda^S(\psi^{\#}) + \epsilon^S$ if I = 1

where $E(\epsilon^M \mid I = 0) = E(\epsilon^S \mid I = 1) = 0$. The result is a set of consistent estimates $\beta^M{}_j{}^\#$, $\beta^S{}_j{}^\#$, $\beta^D{}_j{}^\#$ (j=0,1,2,...,k), $\gamma^{M\#}$ and $\gamma^{S\#}$.

Equation (11), once estimated, gives two equations relating mean values of the dependent and independent variables, one for male-headed families:

$$(12) \qquad \bar{Y}^{SM} = \beta^S{}_0{}^\# + \sum_{j=1}^{k} \beta^S{}_j{}^\# \bar{X}^{SM}{}_j + \gamma^{S\#} \bar{\lambda}^{SM}(\psi^\#) + \bar{\epsilon}^{SM\#}$$

and one for female-headed families:

$$(13) \qquad \bar{Y}^{SF} = \alpha^S{}_0{}^\# + \sum_{j=1}^{k} \alpha^S{}_j{}^\# \bar{X}^{SF}{}_j + \gamma^{S\#} \bar{\lambda}^{SF}(\psi^\#) + \bar{\epsilon}^{SF\#}$$

where $\alpha^S{}_j{}^\# = \beta^S{}_j{}^\# + \beta^D{}_j{}^\#$ and $\bar{\epsilon}^{SM\#}$ and $\bar{\epsilon}^{SF\#}$ are observed mean errors for male-headed families and female-headed families, respectively.[2]

The poverty status differential between male-headed families and female-headed families can be decomposed in such a way as to help reveal the reasons why female-headed families are poorer on average than male-headed families. The decomposition is as follows:[3]

$$(14) \qquad \bar{Y}^{SM} - \bar{Y}^{SF} = \underbrace{(\beta^S{}_0{}^\# - \alpha^S{}_0{}^\#)}_{\text{component 1}} + \underbrace{\sum_{j=1}^{k} (\beta^S{}_j{}^\# - \alpha^S{}_j{}^\#) \bar{X}^{SM}{}_j}_{\text{component 2}} +$$

$$\underbrace{\sum_{j=1}^{k} (\bar{X}^{SM}{}_j - \bar{X}^{SF}{}_j) \alpha^S{}_j{}^\#}_{\text{component 3}} + \underbrace{[\bar{\lambda}^{SM}(\psi^\#) - \bar{\lambda}^{SF}(\psi^\#)] \gamma^{S\#}}_{\text{component 4}} +$$

$$\underbrace{(\bar{\epsilon}^{SM\#} - \bar{\epsilon}^{SF\#})}_{\text{component 5}}.$$

From equation (14) we can estimate how much of the poverty differential between male-headed families and female-headed families is due to: (a) differences in the average levels of the control variables (component 3) and in the average level of the selection variable (component 4), (b) differences in the marginal effects of the control variables (component 2), and (c) other, unexplained differences (components 1 and 5). If poverty is unrelated to family type then components 1 and 2 will be close to zero. In this case a positive poverty status differential between male-headed families and female-headed families could arise because male-headed families have more "favorable"[4] levels of the control variables. If so, component 3 will be large and positive. On the other hand, the poverty status of male-headed families could exceed that of female-headed families because the marginal effects of the control variables are more "favorable"[5] to male-headed families. In this case poverty is related to family type and component 2 will be large and positive.

The poverty status differential between married-couple families and female-headed families can be decomposed as follows:

$$(15)\quad \bar{Y}^{M} - \bar{Y}^{SF} = \underbrace{(\beta^{M}_{0}{}^{\#} - \alpha^{S}_{0}{}^{\#})}_{\text{component 1}} + \underbrace{\sum_{j=1}^{k} (\beta^{M}_{j}{}^{\#} - \alpha^{S}_{j}{}^{\#})\ \bar{X}^{M}_{j}}_{\text{component 2}} +$$

$$\underbrace{\sum_{j=1}^{k} (\bar{X}^{M}_{j} - \bar{X}^{SF}_{j})\ \alpha^{S}_{j}{}^{\#}}_{\text{component 3}} + \underbrace{[\bar{\lambda}^{M}(\psi^{\#}) - \bar{\lambda}^{SF}(\psi^{\#})]\ \gamma^{S\#}}_{\text{component 4}} +$$

$$\underbrace{(\gamma^{M\#} - \gamma^{S\#})\ \bar{\lambda}^{M}(\psi^{\#})}_{\text{component 5}} + \underbrace{(0 - \bar{\epsilon}^{SF\#})}_{\text{component 6}}.$$

Components 3 and 4 of equation (15) measure differences in the average levels

of the control variables and the selection variable, respectively. Components 2 and 5 measure differences in the marginal effects of the control variables and the selection variable, respectively. Components 1 and 6 measure unexplained differences in mean poverty status of married-couple families and female-headed families. If a positive poverty status differential between married-couple families and female-headed families can be explained by the levels of the control variables, without reference to family type, then component 3 will be large compared with the sum of the remaining components. A relationship between poverty and family type will show up in nonzero values for components 1 and 2.[6]

3. VARIABLES AND DATA

The dependent variable, our measure of the family's poverty status, is before-tax family income, expressed as a percentage of the poverty line for a family with the same number of adults and the same number of children as the family in question. Family income includes wages and salaries, self-employment income, interest, dividends, net rental income and social security. The paper analyses pre-transfer poverty so before-tax family income, rather than after-tax family income, is employed and public assistance income is excluded. For the same reason we do not wish to include other government transfers (in cash or in kind) in family income. It would be desirable to include non-cash components of income such as fringe benefits, home produced goods and services etc., but the necessary data are not available. The poverty lines used were those of the U.S. Department of Commerce, Bureau of the Census.[7] These official poverty thresholds vary according to the size and composition of the family but not according to geographical location, despite the fact that the cost of living varies considerably from one region of the country to another. Unfortunately,

price indices, suitable for deflating poverty thresholds for regional differences in the cost of living, are not available in the United States. This problem is partially overcome by using data for a restricted geographical area. For brevity, the dependent variable will be referred to hereafter as "relative income". If relative income is less than 100 then the family is poor.[8]

The literature provides little guidance as to which variables, in addition to the relative income differential, should be included in the selection equation.[9] The data set also limited the choice of variables. Two are used here: DIVORCE, which equals one if the family head has never been divorced and zero otherwise; and DMARITAL, which equals one if the family head is female with more education than a four year college degree or male with less than an eighth grade education. Intuitively, it seems that a randomly chosen family head would have a larger probability of being single if he or she had previously been divorced than if he or she had never been divorced, ceteris paribus. Therefore, the coefficient of DIVORCE in equation (9) is expected to be negative. If males seek mates who are less educated than themselves and if females seek mates who are more educated than themselves then highly educated females and poorly educated males are more likely to be single than other family heads, ceteris paribus. Therefore, the coefficient of DMARITAL in equation (9) is expected to be positive.

The control variables in the regression equations can be divided into two groups: (1) those which describe certain personal characteristics of the members of the family and the location of the family, and (2) those which measure the size and composition of the family. Each control variable affects either family income, the poverty line, or both.[10]

Characteristics of the Family

DEDUC1 = 1 if the family head has a high school diploma but no college education; DEDUC1 = 0 otherwise.

DEDUC2 = 1 if the family head has some college education but no more than a four year college degree; DEDUC2 = 0 otherwise.

DEDUC3 = 1 if the family head has more than a four year college degree; DEDUC3 = 0 otherwise.

HUMCAP: aggregate number of years of schooling completed by all able-bodied adults in the family, who are 65 years or younger and not in school, other than the head of the family.[11]

HAGE: age of the head of the family.

HAGE2: HAGE2 = HAGE*HAGE.

HWKSU79: number of weeks during which the head of the family was unemployed during 1979.

DHDIS1 = 1 if the head of the family has a limited work disability; DHDIS1 = 0 otherwise.

DHDIS2 = 1 if the head of the family is prevented from working because of a work disability; DHDIS2 = 0 otherwise.

DHRACE1 = 1 if the head of the family is black; DHRACE1 = 0 otherwise.

DHRACE2 = 1 if the head of the family is neither black nor white; DHRACE2 = 0 otherwise.

DAREA1 = 1 if the family is located in an urban fringe area; DAREA1 = 0 otherwise.

DAREA2 = 1 if the family is located in an urban area which is not central city nor urban fringe; DAREA2 = 0 otherwise.

DAREA3 = 1 if the family is located in a rural area: DAREA3 = 0 otherwise.

The variables DEDUC1, DEDUC2, DEDUC3, HUMCAP, HAGE, HAGE2, HWKSU79, DHDIS1 and DHDIS2 are included in the analysis because they measure productivity differences across families. DHRACE1 and DHRACE2 capture any racial discrimination in the labor market, while DAREA1, DAREA2 and DAREA3 take account of geographical differences across labor markets caused by immobility of labor.

Size and Composition of the Family

ADULTS: number of able-bodied adults in the family, 65 years or younger and not in school, including the head of the family and his or her spouse, if present.

INFANTS: number of children, five years or younger, in the family.

DEPEND: number of other dependents in the family, calculated as number of people in the family minus ADULTS, minus INFANTS.

The variables ADULTS, DEPEND and INFANTS reflect differences in the size and composition of families. These variables may be related to the gender and marital status of the family head. For example, female-headed families are expected to have fewer ADULTS but more INFANTS than other families.

Relative income is expected to be directly related to DEDUC1, DEDUC2, DEDUC3, HUMCAP, and HAGE, and inversely related to HAGE2, HWKSU79, DHDIS1, DHDIS2, DHRACE1, DHRACE2, ADULTS, DEPEND and INFANTS. The relationship between relative income and DAREA1 and DAREA2 is not clear, a priori. The coefficient of DAREA3 is expected to be negative because labor immobility suggests lower incomes for people living in rural areas.

The data used to estimate the model are the Public Use Microdata Sample (C Sample) for the state of North Carolina, collected by the U.S. Department of

Commerce, Bureau of the Census.[12] This is a one percent random sample of households from the 1980 United States Census of Population and Housing. For the purpose of this study, vacant households, people living in group quarters or nonfamily households, and unrelated individuals living alone or in family households were excluded from the data set. This left a sample of 15,838 North Carolina families of which 12,994 were married-couple families, 453 were male-headed families, and 2,391 were female-headed families. By limiting data to that of a single state regional differences in the cost of living and the effect on family income of state specific welfare programs can be ignored.

4. POVERTY STATUS AND FAMILY TYPE - RESULTS[13]

Means and standard deviations of the dependent and independent variables, by family type, are presented in Table 2. Female-headed families are, on average, the poorest, followed by male-headed families. Heads of married-couple families are more likely to have a high school diploma only and are more likely to have more than a four year college degree than heads of other families. They also reside with nondependents who have more education than single adult heads of families. These married people were unemployed for fewer weeks during 1979 than single heads of families. They are less likely to be seriously disabled, are more likely to be white, and less likely to be black. They are less likely to reside in a central city area, and are more likely to reside in an urban fringe or rural area. They reside in families with more nondependent adults and fewer dependents over the age of five than single heads of families.

Single female heads of families are less likely to have graduated from high school, and are less likely to have any college education, than other family

heads. They also reside with nondependents who have less education than heads of other families. These single women were unemployed for more weeks during 1979 than heads of other family types. They are more likely to be seriously disabled, are more likely to be black and less likely to be white, than heads of other families. They are more likely to live in a central city area, and less likely to live in an urban fringe or rural area. They live in families with fewer nondependent adults and more dependents than heads of other families. Single male heads of families are more likely to have graduated from high school and are more likely to have some college education than other family heads. They also and have fewer dependents under the age of five than female heads of families or heads of married-couple families.

Regression equations for the three family types, corrected for self-selection bias, are given in Table 3. The estimated parameters in all equations have the expected signs. In most cases the coefficients are highly significant, the exceptions being families headed by single males, in which case the effects of a mild disability, of being neither white nor black, and geographical location are not significant. Also, the coefficient of HAGE2 in the equation for female-headed families is not significantly different from zero. Considering the large samples employed, each equation fits the data well as indicated by its coefficient of determination, and its F statistic which tests the hypothesis that all slope coefficients are zero.

Not only does relative income increase with the education level of the head of the family, it increases at an increasing rate. Relative income of married-couple families rises to a maximum when the family head is approximately 55 years old then decreases, ceteris paribus. Maximum relative income for male-

headed families occurs at about age 54 years. For female-headed families, relative income is maximized when the head is 86.6 years old, in other words, there is no effective maximum.

If the head of the family is disabled then, ceteris paribus, relative income is lower than for families with an able bodied head and the greater the disability, the lower is relative income. Families with heads who are nonwhite have lower relative incomes than families with heads who are white. Among married-couple families and among male-headed families, blacks are the poorest. Geographical differences in relative income are observed, ceteris paribus, relative income being smallest in the rural areas of North Carolina.

The influence on poverty of the three variables which measure family size and composition is of particular interest because when people think of the typical family headed by a single woman they usually have in mind a family with more young children and fewer adults than the typical married-couple family. Table 3 shows that, ceteris paribus, each additional child of five years or younger, reduces relative income of each family type more than each additional dependent who is older than five. Furthermore, an additional dependent (less than five years old or otherwise) reduces relative income of married-couple families more than that of families headed by a single adult. These rates of change of relative income with respect to each control variable, assume <u>other things are equal</u>. In the case of the number of adults, other things are unlikely to be equal; each nondependent adult will likely contribute some human capital to the family. For example, an additional, nondependent adult, with 12 years of education, would slightly reduce (by 6.3 percentage points) the relative income of a married-couple family. Such an individual would contribute 29.8

percentage points to the relative income of a female-headed family and 11.9 percentage points to the relative income of a male-headed family.

The coefficient of the selection variable is positive in both regression equations. This suggests that the relative income of a given married-couple family is larger than the relative income of a family headed by a single adult, with the same levels of the control variables as the married-couple family, if the family head were married. Similarly, the relative income of a given family headed by a single adult is larger than the relative income of otherwise identical married-couple family, if its head were single.

Table 4 presents the reduced form probit equation.[14] As expected, the coefficient of DIVORCE is negative and the coefficient of DMARITAL is positive, although not significantly different from zero. The reduced form indicates that the probability of the family head (male or female) being single tends to decrease as his or her level of education increases, and as the level of education of other adults in the family increases. The probability of being single initially falls with age then begins to rise again. A serious work disability increases the probability of a family head being single, although a mild disability seems to have little effect. Family heads who are nonwhite are more likely to be single than white family heads. In the case of male family heads, the probability of being single is a decreasing function of the number of infants and other dependents in the family but (paradoxically) is an increasing function of the number of nondependent adults in the family. In the case of female family heads the opposite occurs: the probability of being single decreases with the number of nondependent adults and increases with the number of infants and other dependents.

The goodness-of-fit of the probit equation can be gauged by the percentage of correct predictions it makes on past data. Of the 15,838 predictions made, the reduced form was correct in 95.1 percent of cases. To put this figure in perspective, a naive model which always predicted the family head to be married would be correct in 82.0 percent of cases.

5. POVERTY STATUS DIFFERENTIALS

Male-Headed Families versus Female-Headed Families

Table 5 decomposes the relative income differential of 77.35 between male-headed families and female-headed families into the five components on the right hand side of equation (14) as follows:

Components 1 and 5: If male-headed families and female-headed families had the same mean levels of the independent variables, including the selection variable, and the same marginal effects of the control variables then relative income would be 99.13 points higher for female-headed families than for male-headed families. This effect is due to the much larger constant term in the equation for female-headed families.

Component 2: If male-headed and female-headed families had the same mean levels of the independent variables, including the selection variable, the same constant terms and the same average errors then relative income would be 112.13 points higher for male-headed families. This differential is attributable to the overall "superiority" of the marginal effects in the relative income equation of male-headed families. Although the marginal effects of unemployment, disability and the numbers of nondependents and dependents favor female-headed families, the

marginal effects of the other variables, particularly age and education, favor male-headed families.

Components 3 and 4: If male-headed and female-headed families had the same marginal effects of the control variables, the same constant terms and the same average errors, then relative income would be (18.79 + 45.56) = 64.35 points higher for male-headed families. That is, a differential of 64.35 is attributable to male-headed families' "superior" mean levels of the independent variables, especially the selection variable. Among the control variables, male-headed families benefit particularly from having more education and fewer dependents than female-headed families.

Note that the regression (components 2 and 3) accounts for a differential of 130.92 in favor of male-headed families. That is, if both family types kept their current levels of the control variables, and kept their current marginal effects of the control variables, but were given the same constant coefficient, the same selection variable and the same average error then male-headed families would have a relative income 130.92 points higher than female-headed families.

Married-Couple Families versus Female-Headed Families

The relative income differential of 171.91 between married-couple families and female-headed families is decomposed into its six component parts in Table 6 as follows:

Components 1 and 6: If married-couple families and female-headed families had the same mean levels of the independent variables, including the selection variable, and the same marginal effects of the independent variables, including the selection variable, then the relative income differential would be 16.16

points in favor of married-couple families. This effect is due to the larger constant term in the equation for married-couple families.

Components 2 and 5: If married-couple families and female-headed families had the same mean levels of the independent variables, including the selection variable, the same constant terms, and the same mean errors, then the relative income differential would be (106.88 + 1.82) = 108.70 points in favor of married-couple families. This differential is attributable to the overall "superiority" of the marginal effects in the relative income equation of married-couple families. The marginal effects of education and age favor married-couple families to such an extent as to outweigh the marginal effects of the other variables, all of which favor female-headed families. In particular, the marginal effects of the numbers of nondependents and dependents favor female-headed families.

Components 3 and 4: If married-couple families and female-headed families had the same marginal effects of the independent variables, including the selection variable, the same constant terms and the same average errors then the relative income differential would be (56.07 - 9.01) = 47.06 points in favor of married-couple families. This differential is attributable mainly to the fact that married-couple families have more education, and are more likely to be headed by a white than female-headed families.

The regression (components 2 and 3) accounts for a differential of 162.95 points in favor of married-couple families. That is, if both family types were given the same constant coefficient, the same selection variable, the same coefficient of the selection variable, and the same average errors but kept their slope coefficients and mean levels of the control variables then the relative

income of married-couple families would be 162.95 points higher than that of female-headed families.

6. CONCLUSIONS

This paper has investigated the relationship between poverty and family type, in an attempt to gain some insight into why the poverty rate for female-headed families is so much higher than that of other families. A number of control variables have been identified as important determinants of poverty for all family types: education of family members; age, race, disability, and unemployment of the family head; geographical location, size and composition of the family.

Differences between average poverty levels of (a) married-couple families, and female-headed families (with no husband present), and (b) male-headed families and female-headed families (each with no spouse present) can be partially explained by differences in the average levels of the control variables. Families headed by females have "inferior" levels of the control variables (taken as a group) compared with both male-headed families and married-couple families. In particular, female-headed families, on average, have less education, have more dependents, and are more likely to be nonwhite than other family types. All these factors contribute to the high poverty rate among people living in female-headed families.

Some of the differences between the average poverty levels of the two pairs of family types can be attributed to differences in the marginal effects of the control variables on poverty. The marginal effects of control variables (in aggregate) favor both male-headed families and married-couple families over

female-headed families. In particular, additional units of human capital are more valuable to both male-headed families and married-couple families than to female-headed families. Also, the marginal effect of the age of the family head benefits married-couple families and male-headed families more than female-headed families. On the other hand, the marginal effects of being disabled and of the numbers of dependents and nondependents benefit female-headed families more than both male-headed families and married-couple families, but not enough to outweigh the marginal effects of the other control variables.

In summary, the results presented in this paper suggest that both male-headed families and married-couple families are less poor than female-headed families mainly because the marginal effects of the control variables favor the former over the latter and to a lesser extent because the former have more favorable mean levels of the control variables. In both comparisons there is a sizeable unexplained differential favoring female-headed families over male-headed families and married-couple families over female-headed families.

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FOOTNOTES

1. The downward trend has been due, in large part, to the declining poverty rate among the elderly (Ellwood and Summers, 1986).

2. Although the observed error terms average zero over all families headed by single adults, mean errors for male-headed families only and for female-headed families only are not necessarily zero.

3. Decompositions using regression models were deveoped by Blinder (1973). Other decompositions are possible, and some were tried, with empirical results consistent with those reported in Sections 4 and 5 of this paper.

4. A large (small) level of a control variable is "favorable" if its marginal effect is to reduce (increase) poverty.

5. If the marginal effect of a control variable is to reduce (increase) poverty then the more (less) it does so the more "favorable" is the marginal effect.

6. The poverty status differential between married-couple families and male-headed families can be similarly decomposed. We do not do so here because our interest is in comparing female-headed families to other family types.

7. See 1980 Census of Population, Volume 1, Chapter C, Appendix B.

8. A binary variable, equal to one if the family is poor and zero otherwise, could have been used as the dependent variable but would convey less information about the poverty status of the family than relative income. Furthermore, the decomposition of poverty status differentials given in Section 2 would not be possible if the dependent variable were binary.

9. Although there are models which predict whether or not a given marriage will end in divorce (for example, Becker, Landes and Michael, 1977), and whether or not a divorced person will remarry (for example, Duncan and Hoffman, 1985), I know of no model which predicts whether or not a randomly chosen individual will be married at a given point in time.

10. See Hagenaars (1986, chapter 3) for a review of theories concerning the determinants of family income.

11. The number of years of schooling includes nursery school and kindergarten. Therefore, someone with a high school diploma, but no higher education, is recorded as having 14 completed years of schooling.

12. These data were made available on magnetic tape by the Inter-university Consortium for Political and Social Research. Neither the Census Bureau, nor the Consortium, bear any responsibility for the analyses or interpretations presented here.

13. The results reported in Sections 4 and 5 are, for the most part, consistent with those obtained using a regression model, with no correction for self-selection bias, and data for the state of Texas. See Rodgers (1990).

14. Note that the coefficients in Table 4 do not equal the marginal effects of the control variables. Nevertheless, the sign of each coefficient indicates the direction of the marginal effect.

TABLE 1

POVERTY IN THE U.S.A., 1959-89

YEAR	% OF ALL PERSONS WHO ARE POOR (1)	% OF PERSONS IN FEMALE HD FAMILIES WHO ARE POOR (2)	% OF PERSONS IN OTHER FAMILIES WHO ARE POOR (3)	% OF UNRELATED INDIVIDUALS WHO ARE POOR (4)
1959	22.4	49.4	18.2	46.1
1960	22.2	48.9	18.0	45.2
1961	21.9	48.1	17.6	45.9
1962	21.0	50.3	16.4	45.4
1963	19.5	47.7	14.9	44.2
1964	19.0	44.4	14.7	42.7
1965	17.3	46.0	12.8	39.8
1966	14.7	39.8	10.3	38.3
1967	14.2	38.8	9.6	38.1
1968	12.8	38.7	8.3	34.0
1969	12.1	38.2	7.4	34.0
1970	12.6	38.1	7.7	32.9
1971	12.5	38.7	7.5	31.6
1972	11.9	38.2	6.8	29.0
1973	11.1	37.5	6.0	25.6
1974	11.2	36.5	6.2	24.1
1975	12.3	37.5	7.2	25.1
1976	11.8	37.3	6.4	24.9
1977	11.6	36.2	6.2	22.6
1978	11.4	35.6	5.9	22.1
1979	11.7	34.9	6.3	21.9
1980	13.0	36.7	7.4	22.9
1981	14.0	38.7	8.1	23.4
1982	15.0	40.6	9.1	23.1
1983	15.2	40.2	9.3	23.1
1984	14.4	38.4	8.5	21.8
1985	14.0	37.6	8.2	21.5
1986	13.6	38.3	7.4	21.6
1987	13.4	38.1	7.2	20.8
1988	13.0	37.2	6.9	20.6
1989	12.8	35.9	7.0	19.2

Source: Money Income and Poverty Status in the United States: 1989. U.S. Dept of Commerce, Bureau of the Census, Current Population Reports, Consumer Income, Series P-60, No. 168, Table 19.

TABLE 2

MEANS AND STANDARD DEVIATIONS OF VARIABLES

(Various Household Types, North Carolina, 1979)

		MARRIED-COUPLE FAMILIES (1)	MALE-HEADED FAMILIES (2)	FEMALE HEADED FAMILIES (3)
STINCOME:	mean	342.37	247.81	170.46
	s.d.	(244.84)	(196.11)	(141.72)
DEDUC1:	mean	0.28	0.24	0.26
	s.d.	(0.45)	(0.43)	(0.44)
DEDUC2:	mean	0.23	0.37	0.16
	s.d.	(0.42)	(0.37)	(0.37)
DEDUC3:	mean	0.07	0.06	0.02
	s.d.	(0.25)	(0.24)	(0.16)
HUMCAP:	mean	13.90	9.04	7.19
	s.d.	(8.65)	(10.44)	(10.66)
HAGE:	mean	44.92	46.67	46.57
	s.d.	(15.51)	(18.02)	(17.37)
HWKSU79:	mean	1.00	1.79	2.06
	s.d.	(4.77)	(6.89)	(7.55)
DHDIS1:	mean	0.06	0.08	0.06
	s.d.	(0.24)	(0.27)	(0.23)
DHDIS2:	mean	0.09	0.14	0.15
	s.d.	(0.28)	(0.35)	(0.36)
DHRACE1:	mean	0.14	0.37	0.42
	s.d.	(0.35)	(0.48)	(0.49)
DHRACE2:	mean	0.01	0.02	0.02
	s.d.	(0.11)	(0.15)	(0.14)
DAREA1:	mean	0.13	0.11	0.10
	s.d.	(0.34)	(0.31)	(0.30)
DAREA2:	mean	0.13	0.14	0.19
	s.d.	(0.33)	(0.35)	(0.39)
DAREA3:	mean	0.56	0.50	0.43
	s.d.	(0.50)	(0.50)	(0.50)
ADULTS:	mean	1.93	1.59	1.42
	s.d.	(0.73)	(0.87)	(0.87)
DEPEND:	mean	1.03	1.08	1.35
	s.d.	(1.10)	(1.05)	(1.17)
INFANTS:	mean	0.30	0.24	0.32
	s.d.	(0.60)	(0.57)	(0.64)
Sample Size		12994	453	2391

Source: Public Use Microdata Sample (Sample C), 1980 U.S. Census of Population and Housing.

TABLE 3

EFFECT OF FAMILY TYPE ON POVERTY

REGRESSION COEFFICIENTS WITH P-VALUES* IN PARENTHESES
(North Carolina, 1979)

VARIABLE	MARRIED-COUPLE FAMILIES (1)	MALE-HEADED FAMILIES (2)	FEMALE-HEADED FAMILIES (3)
ONE	131.6770 (0.0000)	16.3796 (0.7702)	115.5100 (0.0000)
DEDUC1	57.7185 (0.0000)	40.8833 (0.0078)	45.2878 (0.0000)
DEDUC2	124.5090 (0.0000)	87.8127 (0.0000)	74.3119 (0.0000)
DEDUC3	197.0720 (0.0000)	199.3180 (0.0000)	167.5860 (0.0000)
HUMCAP	12.5240 (0.0000)	8.5754 (0.0000)	5.7246 (0.0000)
HAGE	17.1176 (0.0000)	12.7703 (0.0000)	4.0350 (0.0000)
HAGE2	-0.1545 (0.0000)	-0.1176 (0.0000)	-0.0233 (0.4907)
HWKSU79	-3.6222 (0.0000)	-3.5677 (0.0001)	-1.2583 (0.0000)
DHDIS1	-40.9959 (0.0000)	-25.7404 (0.2477)	-24.5417 (0.0000)
DHDIS2	-224.2940 (0.0000)	-137.3190 (0.0000)	-78.4174 (0.0000)
DHRACE1	-64.8203 (0.0000)	-47.8146 (0.0005)	-55.5569 (0.0000)
DHRACE2	-45.0062 (0.0064)	-18.2245 (0.6391)	-61.5537 (0.0000)
DAREA1	-34.3337 (0.0000)	-11.0734 (0.6072)	-22.1767 (0.0000)
DAREA2	-28.5109 (0.0000)	7.8424 (0.6929)	-23.1220 (0.0000)
DAREA3	-47.4287 (0.0000)	-22.4388 (0.1333)	-26.6824 (0.0000)
ADULTS	-156.5530 (0.0000)	-91.0277 (0.0003)	-38.9013 (0.0000)
DEPEND	-47.3848 (0.0000)	-20.1798 (0.0012)	-18.6371 (0.0000)
INFANTS	-65.0556 (0.0000)	-49.7145 (0.0000)	-38.1847 (0.0000)
SELECTIVITY VARIABLE	11.8881 (0.1341)		31.4018 (0.0257)
N = 12994 F-STAT = 311.896 P-VALUE = 0.000 R-SQ = 0.302 ADJ-R-SQ = 0.301		N = 2844 F-STAT = 42.957 P-VALUE = 0.000 R-SQ = 0.355 ADJ-R-SQ = 0.347	

*. P-values are for a 2-tailed test.

TABLE 4

MARITAL STATUS EQUATION

(North Carolina, 1979)

	REDUCED FORM EQUATION			
	MALES		FEMALES	
VARIABLES	COEFFICIENT (1)	P-VALUE* (2)	COEFFICIENT (3)	P-VALUE* (4)
ONE	0.4342	0.0926	2.1637	0.0001
DEDUC1	-0.1072	0.1376	-0.0902	0.8796
DEDUC2	-0.7218	0.3765	-0.1118	0.7606
DEDUC3	0.7562	0.5353	-0.2380	0.1810
HUMCAP	-0.0694	0.0000	-0.0216	0.0016
HAGE	-0.0554	0.0000	-0.0281	0.0740
HAGE2	0.0005	0.0000	0.0003	0.2246
HWKSU79	0.0032	0.4541	0.0082	0.4566
DHDIS1	-0.0414	0.6834	-0.1778	0.4234
DHDIS2	0.5772	0.0001	0.0487	0.0339
DHRACE1	0.7445	0.0000	0.7574	0.8974
DHRACE2	0.5469	0.0041	0.4608	0.7891
DAREA1	-0.1413	0.1303	-0.1502	0.6937
DAREA2	-0.0332	0.7073	-0.0215	0.9317
DAREA3	-0.0954	0.1569	0.0129	0.3252
ADULTS	0.4996	0.0000	-0.0296	0.0077
DEPEND	-0.0804	0.0017	0.0280	0.0112
INFANTS	-0.2026	0.0000	0.1711	0.0000
DIVORCE	-1.4564	0.0000	-1.4564	0.0000
DMARITAL	0.0044	0.9549	0.0044	0.9549
N	15838	LOG-LIKELIHOOD		-2257.9
CHI-SQUARE (37 D.F.)	10395.0	SIGNIFICANCE LEVEL		0.32173E-13

*. All P-values are for a 2-tailed test. The P-values in column 4, except those for DIVORCE and DMARITAL are P-values for the interaction between HSEX and the corresponding control variable, where HSEX = 1 if the head of the family is female and zero otherwise.

TABLE 5

POVERTY DIFFERENTIAL BETWEEN MALE-HEADED FAMILIES

AND FEMALE-HEADED FAMILIES

(North Carolina, 1979)

	AVERAGE LEVELS OF CONTROL VARIABLES (Component 3)	MARGINAL EFFECTS OF CONTROL VARIABLES (Component 2)	TOTAL (Components 3 and 2)
EDUCATION	16.00	28.90	44.90
AGE	-0.34	171.66	171.32
UNEMPLOYMENT	0.34	-4.13	-3.79
DISABILITY	-0.08	-8.54	-8.62
RACE	2.95	3.89	6.84
LOCATION	-1.08	7.80	6.72
NONDEPENDENTS	-6.76	-82.96	-89.72
DEPENDENTS	7.76	-4.47	3.29
SUBTOTAL	18.79	112.13	130.92
	Component 4		
SELECTION VARIABLE	45.56		45.56
UNEXPLAINED DIFFERENTIAL (Component 1)			-99.13
	(Component 5)		0.00
TOTAL DIFFERENTIAL			77.35

TABLE 6

POVERTY DIFFERENTIAL BETWEEN MARRIED-COUPLE FAMILIES AND FEMALE-HEADED FAMILIES

(North Carolina, 1979)

	AVERAGE LEVELS OF CONTROL VARIABLES (Component 3)	MARGINAL EFFECTS OF CONTROL VARIABLES (Component 2)	TOTAL (Components 3 and 2)
EDUCATION	51.76	111.65	163.41
AGE	-1.73	291.28	289.55
UNEMPLOYMENT	1.33	-2.36	-1.03
DISABILITY	4.76	-13.61	-8.85
RACE	16.06	-1.13	14.93
LOCATION	-2.64	-13.85	-16.49
NONDEPENDENTS	-20.08	-227.54	-247.62
DEPENDENTS	6.61	-37.56	-30.95
SUBTOTAL	56.07	106.88	162.95
	Component 4	Component 5	
SELECTION VARIABLE	-9.01	1.82	-7.19
UNEXPLAINED DIFFERENTIAL (Component 1)			16.17
	(Component 6)		-0.01
TOTAL DIFFERENTIAL			171.91