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Behavioral Responses to Social Security Retrenchment:

Estimates from a Trichotomous Choice Model

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Abstract

This paper makes use of a three-way qualitative choice model to evaluate the response of men between the ages of 62 and 65 to changes in expected benefit levels in public transfer programs. The choices available to them are work, OASI early retirement, and social security disability benefits. It is found that older workers respond more readily to changes in nontransfer income than to changes in transfer income.

The responses of older workers are then simulated for two changes in the system: a 20 percent decrease in OASI benefits for early retirement, and an age-related earnings supplement. Substantial reductions in OASI benefits appear to reduce the number of early retirees in OASI by only a small percentage. An earnings supplement decreases the number of early retirees by a greater amount, but causes government expenditures to rise sharply.

Behavioral Responses to Social Security Retrenchment: Estimates from a Trichotomous Choice Model

I. INTRODUCTION

Numerous studies of choices in response to changes in the utility or income associated with various options have established that individuals do tend to respond rationally to the expected value of options with which they are confronted. Many of these index function modeling efforts have focused on the labor supply decision, in the context of public income transfers, in particular the retirement decision in response to social insurance benefits decision (see Boskin, 1977; Boskin and Hurd, 1978; Burkhauser, 1980; Burkhauser and Quinn, 1980; Gordon and Blinder, 1980; Burtless and Moffitt, 1984; Diamond and Hausman, 1984)[1] and the decision to seek or accept disability benefits in response to their generosity and availability (see Parsons, 1980; Haveman and Wolfe, 1984a, 1984b). The estimated response elasticities which these analyses produced have had an important influence on the public debate over the economic efficiency consequences of redistribution policies (see Danziger, Haveman, and Plotnick, 1981).

In this paper, we make three contributions to this literature. First, we provide estimates of the responses that older workers will make to reductions in the generosity of early retirement income support provided through the social insurance system, and thus address a current issue in the ongoing public debate surrounding social insurance benefits and retirement policy. Second, we provide a far richer characterization of the choices faced by older workers, recognizing that disability transfers, early retirement transfers, and continued work effort are all substitute sources of income support and utility. Third, making use of these response estimates, we simulate the effect of a variety of generalized policy changes of the sort now being discussed on both the economic well-being of the families affected and the size of government outlays.

In Section II of this paper we present a three-way qualitative choice model designed to evaluate the response of individuals to changes in expected benefit levels in public transfer programs. Sections III and IV present the sample, the definition of the options, and the empirical estimates of the individual work and transfer recipiency responses of older males. Section V simulates the responses of individuals to expected reductions in benefits upon early retirement and to a work incentive payment. The implications of these responses are estimated for both government program expenditures and total family income of those individuals affected. Concluding remarks are in Section VI.

II. THE TWO-STAGE TRICHOTOMOUS LOGIT-OLS CHOICE MODEL

In the analysis, the estimation model posits a three-way choice for the older males whose behavior we seek to model: labor force participation (WORK), the acceptance of early retirement benefits (OASI), and the securing of Social Security Disability Insurance benefits (SSDI).[2] This requires both an extension of the standard bivariate switching model, and a focus on individuals aged 62-64. This group is one of the few groups who are categorically eligible for the two major income replacement social insurance programs, OASI and SSDI.[3]

Assume that an individual in this group chooses the alternative among the WORK, OASI, or SSDI options that maximizes utility: The income flows associated with each option measure the expected well-being experienced in each option, together with factors such as the stigma cost associated with transfer recipiency. In the model, two expected income flows are associated with each option--nontransfer income (primarily earnings) (NT) and transfer income (T). Hence, each individual must consider 6 income flows in making a choice, as shown in Table 1. These distinctions are important in modeling the choice because attitudes (e.g., stigma), the required quid pro quo associated with income, and differential tax rates cause individuals to derive differing amounts of utility from different sources of income.

A formal statement of the model follows:

Let $V_{ij}(T^*_{ij}, NT^*_{ij}, \underline{Z}_j)$ denote the level of indirect utility for individual j under option i, i = 1, 2, 3 (SSDI, OASI, WORK) where

T^*_{ij} = expected transfer (household) income for individual j under option i

NT^*_{ij} = expected nontransfer (household) income for individual j under option i

$\underline{Z}_j$ = vector of household and individual characteristics for individual j

Assuming additive random utility

$$(1) \qquad V_{ij} = T^*_{ij} + \delta NT^*_{ij} + \underline{\theta}_i' \underline{Z}_j + \varepsilon_{ij}$$

with unknown parameters γ, δ, $\underline{\theta}_i$, and random disturbance ε_{ij}.

Given the choice rule

$$(2) \qquad C_{ij} = \begin{cases} 1 \text{ if } V_{ij} = \max V_{kj} \\ \\ 0 \text{ if } V_{ij} < \max V_{kj}. \end{cases}$$

We obtain the conditional logit model[4]

$$(3) \qquad P_{ij} = \Pr\{C_{ij} = 1\} = \frac{\exp \{\gamma T^*_{ij} + \delta NT^*_{ij} + \underline{\theta}_i' \underline{Z}_j\}}{\sum_{k=1}^{3} \exp\{\gamma T^*_{kj} + \delta NT^*_{kj} + \underline{\theta}_k' \underline{Z}_j\}}.$$

$\underline{Z}$ is observed, but T^*_{ij} and NT^*_{ij} are not. We do, however, observe the actual amount of transfer and nontransfer income accruing to observation j. Let

T_{ij} = observed transfer (household) income for individual j under selected option i

NT_{ij} = observed nontransfer (household) income for individual j under selected option i.

and assume

$$(4) \qquad T_{ij} = T^*_{ij} + v_{ij}$$

$$(5) \qquad NT_{ij} = NT^*_{ij} + w_{ij},$$

where v_{ij} and w_{ij} are random deviations of the observed counterparts from their expectations. We will assume that $E(T^*_{ij}\, v_{ij}) = 0 = E(v_{ij})$, $E(NT^*_{ij}\, w_{ij}) = 0 = E(w_{ij})$.

Table 1

The Available Income Flows

Option Chosen	Expected Income Flow: Transfer Income (T)	Expected Income Flow: Nontransfer Income (NT)
WORK	1. T_L	2. NT_L
OASI	3. T_O	4. NT_O
SSDI	5. T_S	6. NT_S

Finally, assume that the expectations are based on household and individual variables $\underline{X}_j$ according to

(6) $T^*_{ij} = \underline{\alpha}'_i \underline{X}_j$

(7) $NT^*_{ij} = \underline{\beta}'_i \underline{X}_j$,

where, $\underline{\alpha}_i$ and $\underline{\beta}_i$ are vectors of unknown parameters.

The underlying assumption is that individuals form expectations according to (6) and (7), but realizations (4) and (5) differ from expectations due to random errors caused by lack of information on the part of employers, welfare agencies, and the individual.

Thus we substitute (6) and (7) into (4) and (5):

(8) $T_{ij} = \underline{\alpha}'_i \underline{X}_j + v_{ij}$

$NT_{ij} = \underline{\beta}'_i \underline{X}_j + w_{ij}$

The use of $\hat{T}^*_{ij} = \underline{\alpha}'_i \underline{X}_j$ and $NT^*_{ij} = \underline{\beta}'_i \underline{X}_j$ in place of the unobserved expectations in (3) is justified, provided consistent estimators $\hat{\underline{\alpha}}_i$ and $\hat{\underline{\beta}}_i$ can be found.

Obvious candidates for $\hat{\underline{\alpha}}_i$ and $\hat{\underline{\beta}}_i$ are the OLS estimators in (8) and (9), respectively. Because the jth individual is observed in but one of the three categories, however, least squares estimation using the available subsamples will yield inconsistent estimates if selectivity is present.[5]

However, the choice rule (2) leading to (3) makes use of only the T^*_{ij} and NT^*_{ij}, which are the systematic components in (8) and (9). As demonstrated in footnote 5, if the systematic components are independent of the random components, the conditional expectation terms on the right-hand side of conditional versions of (8) and (9) are zero. We adopt this independence assumption.[6]

A simple two-step procedure yielding consistent estimators of (3) under these assumptions exists.[7] First, equations (8) and (9) can be estimated using ordinary least squares [including a selectivity correction variable in (9)][8] for the subsample of individuals falling into the ith category, to obtain $\hat{\underline{\alpha}}_i$ and $\hat{\underline{\beta}}_i$, i = 1, 2, 3. Then, the predicted values of T^*_{ij} and NT^*_{ij} can be constructed for each individual j under each option i from $\hat{T}^*_{ij} = \hat{\underline{\alpha}}_i \underline{X}_j$ and $\hat{NT}^*_{ij} = \hat{\underline{\beta}}_i \underline{X}_j$. Using these constructed values together with $\underline{Z}_j$ in the second step, (3) can be estimated using conditional logit,[9] to obtain the estimates of γ, δ, and $\underline{\theta}_i$.

We employ this model to derive the probability that individual j will be in each of the i states. Combined with sample weights, these probabilities yield predictions of the distribution of men 62-64 among the SSDI, OASI, and WORK alternatives. The $\hat{\gamma}$ and $\hat{\delta}$ from equation (3) serve as the basis for policy simulation.

III. THE SAMPLE AND THE OPTIONS

This model was estimated over a sample of males age 62-64 in 1978 who provided answers to a series of questions regarding application for and receipt of both OASI and SSDI benefits in the 1978 Survey of Disabled and Nondisabled Adults.[10] Our total sample consists of 561 individuals of whom 59 (11 percent), 68 (12 percent), 434 (77 percent) are in the WORK, OASI, and SSDI categories, respectively.[11] Where appropriate in the estimation, we employ the weight assigned by the survey to each respondent, which reflects the number of individuals in the total U.S. population that each represents.

IV. THE RESPONSE ESTIMATES

The empirical estimates of response rest upon both the procedures for estimating the expected income terms and the specification of the conditional logit model itself. We present results on both.

A. Estimating Expected Transfer and Nontransfer Income

An expected income value for both transfer income (T) and nontransfer income (NT)[12] is required for each individual in the sample, conditional on that individual being in the WORK, OASI, or SSDI options. Hence, for each individual, estimates of the six income values shown in Table 1 are required.

To obtain these expected income terms, an OLS income regression for each of the 6 income terms is fit over the appropriate observations in our sample. For example, those individuals who are labor force participants are used for the T_L and NT_L regressions. Then we use each of these regressions to impute an expected income to each observation, were they to have chosen that option.

To obtain unbiased estimates of these expected income values, we account for the selectivity process which determines that some individuals in a group have, and others do not have, income from a particular source, following the procedure proposed by Heckman (1974; 1979).[13]

The NT regressions, including the selectivity variable (λ), are shown in Table 2. In each regression, the dependent variable is the log of NT. With but few exceptions, the economic-demographic variables have the expected sign, and are often significant. While only a few of the health factors are individually significant, nearly all have the expected sign.[14] The F test for the entire group is significant in all of the regressions. The selectivity term is significant in only the OASI regression.

The three regressions in Table 2 (including the λ term) combined with the probability from the probits reported in Appendix Table A-1 are then used to impute NT in each option--that is, $\hat{NT}_L$, $\hat{NT}_O$, and $\hat{NT}_S$--to each of the 561 observations in our sample. That is, $\hat{NT}_i = \hat{P}_{NT_i} \cdot \hat{NT}_i \mid NI > 0$.

Table 3 presents the T regressions for each of the three options. With the exception of the selectivity variable (λ), the structure of these regressions is identical to those for NT.[15] Because transfer income is a combination of benefits from a substantial number of programs, the coefficients are difficult to interpret. Although non-significant, race appears large and positively related to benefit level, except for SSDI recipients. In the SSDI subgroup equation, the presence of dependents' benefits is clearly indicated in the significant spouse-present coefficient. Because a high proportion of the transfer benefits in the WORK option are income-tested, the positive sign on spouse-nonearner is expected. The uniform positive coefficient on education across the three options reflects the fact that both public and private retirement pensions depend on prior earnings, which are positively correlated with the level of education. This tie between earnings and benefits, along with the fact that welfare benefits are generally lower in

Table 2

Log-Linear, Nontransfer Income (NT) Regressions; WORK, OASI, and SSDI Groups
[coefficient (t-statistic)]

	WORK		OASI		SSDI	
	coef.	t-statistic	coef.	t-statistic	coef.	t-statistic
Economic-Demographic Variables						
Nonwhite	-1.63	(-3.22)*	-1.22	(-1.91)*	-.33	(-1.11)
Spouse present	-1.14	(-2.59)*	.89	(1.84)**	.34	(1.46)
Spouse nonearner	-.79	(-2.80)*	-.08	(-.24)	.31	(1.69)**
Top grade	-.02	(-.59)	.07	(1.24)	.07	(2.56)*
Rural	.13	(.48)	-.40	(-1.26)	.18	(.78)
South	-.09	(-.27)	.22	(.69)	-.24	(-1.33)
Health Factors						
Mobile	-.22	(-.92)	-.47	(-2.35)*	-.12	(-1.58)
Worn down	-.10	(-.64)	.10	(.54)	-.15	(-1.61)
Stiff	-.18	(-.80)	-.09	(-.45)	-.06	(-.80)
Respiratory	.25	(.72)	-.26	(-1.47)	.06	(.73)
Selectivity Correction (λ)	.05	(.21)	.56	(2.31)*	-.09	(-.84)
Constant	10.75		7.31		6.65	
R^2	.47		.44		.12	
N	47		45		230	

*Significant at 5% level, two-tail test.

**Significant at 10% level, two-tail test.

Table 3

Log-Linear, Transfer Income (T) Regressions; WORK, OASI, and SSDI Groups
[coefficient (t-statistic)]

	WORK		OASI		SSDI	
	coef.	t-statistic	coef.	t-statistic	coef.	t-statistic
Economic-Demographic Variables						
Nonwhite	1.68	(1.10)	1.90	(1.04)	-.05	(-.44)
Spouse present	.60	(.39)	-.05	(-.03)	.31	(3.69)*
Spouse nonearner	1.69	(1.58)	.09	(.08)	.06	(0.82)
Top grade	.10	(.67)	.05	(.31)	.02	(2.09)*
Rural	-.57	(-.53)	.17	(.17)	.03	(.35)
South	-.18	(-.16)	-.94	(-.98)	-.04	(-.64)
Health Factors						
Mobile	.94	(.98)	-.49	(-1.07)	.04	(1.28)
Worn down	.50	(.86)	-.28	(-.58)	-.03	(-.92)
Stiff	1.52	(2.04)*	-.11	(-.20)	.02	(.67)
Respiratory	-1.56	(-1.54)	.07	(.18)	.03	(.89)
Constant	.89	(.35)	5.87	(2.63)	7.96	(54.2)
R^2	.26		.07		.06	
N	59		68		434	

*Significant at 5% level, two-tail test.

**Significant at 10% level, two-tail test.

Southern states, accounts for the uniform negative sign on the South dummy variable in the regressions. In these cases, the health factors play the greatest role in increasing T for those in the labor force--possibly workers' compensation, for example. The health factors are not significant in the other two regressions.

Table 4 shows the $\hat{T}$ and $\widehat{NT}$ income predictions from the regressions presented in Tables 2 and 3. Consider first the $\hat{T}$ values in the first panel of the table. Reading each of the columns vertically indicates the $\hat{T}$ which would be anticipated by the mean individual in each option, were he in each of the options. For example, if the mean individual in the WORK option had chosen, instead, OASI or SSDI, he could have increased his transfer income from $1247 to $4056 or $5991. The second panel gives anticipated NT for each option. Note that while the mean individual who has chosen the WORK option can expect NT of about $6100, the NT in the WORK option for those who have chosen the OASI and SSDI options is substantially less--$3819 and $1497, respectively. This pattern is not unexpected--those who have chosen to remain in the WORK option have expected labor incomes which are substantially higher than those who have chosen the OASI or SSDI options. In general, the pattern in Table 4 is consistent with the choices individuals actually make.

B. Estimating the Trichotomous Conditional Logit Model

A trichotomous conditional logit model is fit in which the actual choice among the WORK, OASI, and SSDI options is taken to be determined by $\widehat{NT}$ and $\hat{T}$ in each of the options, plus health status, occupation, race, marital status, and education. Table 5 presents the results of this

Table 4

Predicted Values (Standard Errors) of Transfer Income (T)
and Nontransfer Income (NT);
WORK, OASI, and SSDI Groups
(in dollars)

Predicted	Actual		
	WORK	OASI	SSDI
		Transfer Income ($\hat{T}$)	
WORK	1247.1 (1264.1)	1562.2 (1270.6)	2204.8 (1328.0)
OASI	4055.8 (1627.0)	3541.6 (1713.9)	2801.3 (1609.4)
SSDI	5991.0 (839.3)	5630.0 (1151.2)	5312.0 (885.6)
		Nontransfer Income (NT)	
WORK	6135.5 (5171.5)	3818.5 (5399.7)	1496.6 (1341.7)
OASI	1820.4 (3260.3)	1125.9 (1202.1)	204.1 (320.4)
SSDI	729.9 (755.8)	419.9 (491.0)	84.9 (84.8)

Table 5

Trichotomous Conditional Logit Model: Choice among WORK, OASI, and SSDI Options

	Coefficient	T-statistic	Mean
Variables That Vary by Choice:			
Utility weight on NT	.00018	3.36*	
Utility weight on $\hat{T}$	.000057	.69	
Variables Constant across Choices:			
WORK Choice:			
Constant	.648	.70	
Severely disabled[a]	-4.342	9.31*	.82
White collar[a]	.477	.89	.17
Blue collar[a]	-1.417	2.86*	.55
Nonwhite[a]	1.075	1.79**	.11
Spouse present[a]	.477	.87	.80
Education	.007	.11	9.62
OASI Choice:			
Constant	1.031	1.40	
Severely disabled[a]	-3.218	8.65*	.82
White collar[a]	-.638	1.33	.17
Blue collar[a]	-.995	2.87*	.55
Nonwhite[a]	.169	.32	.11
Spouse present[a]	.041	.10	.80
Education	.026	.49	9.62

[a]Dummy variable equals 1 if condition holds.

*Significant at 5% level, two-tail test.

**Significant at 10% level, two-tail test.

estimation. Both $\hat{T}$ and $\hat{NT}$ have the expected positive utility weights[16] and the coefficient on $\hat{NT}$ is significant. The coefficients on the variables which are not state dependent are shown relative to their value for the SSDI choice, which is the omitted choice. Hence, ceteris paribus, the presence of severe disability significantly reduces the probability that an individual will choose the WORK or OASI options, relative to the SSDI option. Having a blue-collar occupation yields the same significant result, reflecting the application of vocational criteria in the SSDI program.

The reliability of this estimating equation was tested by comparing the predicted choices of individuals to their actual choices. The actual distribution of the population is taken from the weighted values of the 62-64-year-old population in the 1978 Survey of Disabled and Nondisabled Adults. The model correctly categorizes 57 percent of those observed in the WORK, but incorrectly predicts that 25 and 17 percent of these individuals choose the OASI and SSDI options, respectively.[17] The choice of 33 percent of those in the OASI option, and 89 percent of those in the SSDI option is correctly predicted.[18] As a test of our results, we used an alternative technique--multinomial logit--and obtained estimated probabilities which were nearly identical to those reported.[19]

V. SIMULATED RESPONSES TO CHANGES IN EXPECTED INCOME

The parameter estimates from this model can be employed in predicting how 62-64-year-old males would alter their choices among the WORK, OASI, and SSDI options in response to changed income opportunities available in each option. In this section, we present the results of two policy simulations:

1. A 20 Percent Reduction in $\hat{T}$ in the OASI Option[20]

2. An Age-Related Earnings Supplement[21]

Table 6 presents the results of our simulations. The first row presents the results for the 20 percent reduction in $\hat{T}_0$. Nearly 19,000 males--about 2.3 percent of existing male recipients--opt to leave OASI early retirement with a 20 percent reduction in income in that option. Two-thirds of those who leave the OASI option choose the WORK option; only one-third opt for and secure early retirement via SSDI. The increase in SSDI beneficiaries represents 2.4 percent of total SSDI beneficiaries.

The final row presents the effect of the earnings supplement proposal. Because individuals appear to respond more readily to changes in $\hat{NT}$ (largely, earned income), the earnings supplement proposal elicits a larger response. An annual earnings supplement which added \$1000 (\$1500) (\$2000) to $\hat{NT}_L$ of individuals 62(63)(64) years of age would lead to an additional 106,500 labor force participants, an increase of 8.5 percent in the number of 62-64-year-olds who are in that category. The bulk of those who shift to the labor force option are from the OASI option, which represents a reduction of about 8.4 percent in the number of OASI recipients.

Table 7 draws out the implications of the changes described in Table 6 for both total government transfer spending and the total income of the male population aged 62-64. The reduction of 20 percent in expected transfer benefits in the OASI option is projected to reduce government spending by \$573 million. Of that reduction, 95 percent shows up as

Table 6

Simulation of Response to Stipulated Changes in OASI
Transfer Incomes and Earnings Supplement,
Males Aged 62-64 in 1978

Status	Absolute and (Percent) Change in Population					
	WORK		OASI		SSDI	
OASI Reduction	+12,601	(1.0)	-18,989	(2.4)	+6,383	(2.4)
Earnings Supplement	+106,548	(8.5)	-67,978	(8.4)	-38,573	(14.7)

Note: A plus sign preceding the number indicates additions to a category; a minus sign preceding a number indicates exits from a category.

Table 7

Summary of Changes in Government Transfers and Total Family Income Attributable to Policy Simulations ($000,000)

	Change in Government Transfers (1)	Change in Total Family Income (2)	Index of Income Response [(2)-(1)÷(1)] (3)
20 Percent Reduction in $\hat{T}_0$	-572.8	-541.4	.055
Median Earnings Supplement	+1783.1	+2020.6	.133

income losses to families of males aged 62-64.[22] Only about 5 percent of the benefit reduction is offset by earnings and other income increases from the shifts out of OASI that the benefit reduction induces.[23] The supplementation of earnings[24] would require an increase in government spending of nearly $1.8 billion, although both OASI and SSDI expenditures and rolls would be reduced. However, the families headed by males aged 62-64 would experience an aggregate increase in income of over $2 billion. Because of the increased attractiveness of the WORK option due to the earnings supplement, individuals from both the OASI and SSDI groups are attracted into that option, thereby increasing their work effort and earned income. Those who shift options in response to the supplement increase earnings by about 15 percent of the supplement paid.

VI. SUMMARY

In this paper we develop and estimate a trichotomous logit model of the work-leisure choice of males aged 62-64. The choices available are defined by the mutually exclusive categories of labor force participation (WORK), social security early retirement (OASI), and social security disability (SSDI) recipiency. Because the model is specified in terms of expected (rather than observed) transfer and nontransfer income flows, predicted values of these flows are obtained from ordinary least squares regressions (with appropriate selectivity corrections) prior to estimating the model. Disability (health factors) are important determinants of these income flows. The estimated parameters of the trichotomous logit model are used to simulate the effects of reductions in OASI benefits on the costs and caseloads of OASI and SSDI, and the changes in labor force participation. An additional simulation involves the granting of a graduated earnings supplement to workers aged 62-64. The 1978 Survey of Disabled and Nondisabled Adults is the data source for all estimations and simulations.

The estimated parameters of the trichotomous logit model indicate that older workers respond more readily to changes in nontransfer income than to changes in transfer income. This result is reflected in the simulations, where substantial reductions in OASI benefits reduce the number of early retirees in OASI by only a small percentage. The effect of the OASI benefit reductions on total cash benefits paid is much larger because the benefits of those who stay in the OASI rolls are affected, as well as those of retirees who change options. Reductions in OASI benefits would result in small increases in DI outlays, as approximately one-third of those on OASI successfully move to DI rolls. The immediate impact of these benefit reductions on total cash benefits paid in both the retirement and disability components of the social security system is quite small, and most of these savings result in nearly equal losses of family income.

Although the earnings supplement would produce a greater decrease in the number of early retirees (8 percent), benefits paid to early retirees would fall by only 1 percent, because the supplement would primarily affect those retirees who have chosen to remain in the labor force. Government expenditures would rise sharply (by $1.8 billion), but family income would rise by an even greater amount. Thus while these results suggest that improving market opportunities for 62-64-year-old men is likely to be the most successful route to reducing the social security rolls, it is also the most costly in terms of government expenditures.

Table A-1

Probability of Receiving Nontransfer Income; Labor Force, OASI, and SSDI Groups

[Probit Coefficient (Asymptotic t-statistic); Receipt of Nontransfer Income = 1]

	Labor Force		OASI		SSDI	
	coef.	asymptotic t-statistic	coef.	asymptotic t-statistic	coef.	asymptotic t-statistic
Economic-Demographic Variables						
Nonwhite	-1.11	(-1.14)	.40	(.49)	-.02	(-.09)
Spouse present	.43	(-.35)	.13	(.24)	.31	(1.84)
Spouse nonearner	-.47	(-.61)	-.28	(-.57)	-.12	(-.82)
Top grade	.07	(.67)	-.03	(-.41)	-.01	(-.69)
Rural	-.01	(-.01)	.63	(1.29)	.01	(.15)
South	-.26	(-.32)	-.52	(-1.21)	-.19	(-1.42)
White collar	.20	(.21)	-1.46	(-2.08)	.2	(.09)
Blue collar	4.95	(.12)	.07	(.18)	.25	(1.70)
Health Factors						
Mobile	-1.03	(-.96)	.36	(1.74)	.08	(1.44)
Worn down	.11	(.25)	.27	(.99)	.09	(1.19)
Stiff	.48	(.78)	.37	(1.33)	.18	(2.84)
Respiratory	-.17	(-.22)	.17	(.96)	-.001	(-.02)
Severely disabled	-2.20	(-1.78)	-1.31	(-1.99)	-.71	(-2.08)
Constant	1.71	(.72)	1.80	(1.60)	.65	(.79)
2 x log likelihood	33.06		26.67		25.85	
N	59		68		434	

Notes

[1]These studies identified a variety of features of transfer programs which have the potential of altering work effort including (1) the expected level of future benefits, which, if leisure is a normal good, may reduce work effort; (2) the earnings test, which imposes high marginal tax rates on earnings above the exempt amount and is thus likely to discourage work effort among recipients; and (3) the asymmetry of the actuarial adjustments for early and delayed retirement. Many proposals considered in conjunction with the 1983 Social Security Amendments were designed to reduce these work disincentives, thereby encouraging older workers to delay retirement. Examples of these proposals include raising the age of first eligibility, limiting cost-of-living increases, taxing the benefits of upper middle and high income beneficiaries, and increasing the value of delayed retirement credits.

[2]We define these choices so that they are mutually exclusive, although it is possible for an early retiree to remain in the labor force. In this case, Old Age and Survivors (OASI) benefits are reduced by fifty cents for each one dollar of earnings beyond a specified exempt amount ($4080 in 1981). Recipients of SSDI benefits may earn up to $190 per month without jeopardizing eligibility status. Earnings above this level may be interpreted by program officials as evidence that the recipient is capable of engaging in substantial gainful activity and, hence, is not eligible for disability benefits. The actual incidence of dual recipiency-work status is quite low.

[3]For data reasons, we employ a sample of only males in this age group. This age-sex category has shown a radical reduction in labor force participation in the last two decades. From 1960 to 1978, the participation rate of males aged 55 to 64 fell from 85.2 percent to 72.5 percent.

[4]See McFadden, 1973.

[5]This is demonstrated by stating the expectations of (8) and (9) conditional on the relevant option as

$$(10)\quad E(T_{ij} \mid C_{ij} = 1, C_{kj} = 0, k \neq i) = \underline{\alpha}_i'\underline{X}_j + E(v_{ij} \mid C_{ij} = 1, C_{kj} = 0, k \neq i)$$

$$(11)\quad E(NT_{ij} \mid C_{ij} = 1, C_{kj} = 0, k \neq i) = \underline{\beta}_i'X_j + E(w_{ij} \mid C_{ij} = 1, C_{kj} = 0, k \neq i),$$

where expectations are understood to be conditional on $\underline{X}_j$ as well. Unless the conditional expectations on the right-hand side of equations (10) and (11) are zero, least squares of $\underline{\alpha}$ and $\underline{\beta}$ obtained from the subsamples for which T_{ij} and NT_{ij} are observed will be inconsistent.

[6]Maximum likelihood methods to test this assumption could be, but are not, used here.

[7]The consistency aspects of this type of polychotomous choice model--termed a multinomial logit-OLS two-stage estimation method--are demonstrated in Lee (1983).

[8]In estimating NT^*_{ij}, we face the difficulty that a number of observations have no nontransfer income ($NT_{ij} = 0$). Therefore to estimate (9) we use Heckman's two-step procedure (Heckman, 1979). In following this procedure we assume that the w_{ij}'s are iid normal.

[9]The conditional logit model is computationally simpler to estimate than multinomial probit and without the technical issues regarding the appropriate iterative method. See McFadden, 1981.

[10]The age of first eligibility for male workers for reduced retirement benefits is 62, with full benefits available if retirement is delayed to age 65. Between ages 62 and 65, benefits received increase by 5/9 of 1 percent for every month that benefits are delayed. See Blinder, Gordon, and Wise (1980) for a discussion of the benefit levels available to early retirees, and the effect of these benefits on the early retirement decision. See also Burkhauser and Turner (1981) for a critique of their analysis. The eligibility requirements and benefits available in the SSDI program are described in Burkhauser and Haveman (1982). We eliminated from the sample, those respondents who indicated that they were civil servants or receiving pensions, because the conditions of eligibility and determination of benefits under those pension programs differ substantially from those in OASI.

[11]A respondent was identified as a SSDI recipient if he responded positively to any two of the following three questions:

a. Did you receive SSDI benefits in 1977?

b. Are you currently receiving SSDI benefits?

c. Is your disability severe (i.e., are you unable to perform any type of work)? or if he responded positively to any one of these three questions and in addition reported receiving (in dollars) some sort of social security benefit, indicated that someone in his immediate family (probably himself) received SSDI benefits, and indicated that he has previously applied for SSDI benefits.

A respondent was identified as an OASI early retiree if he reported receiving (in dollars) some sort of social security benefit and indicated that it was not a disability benefit, and further satisfied at least one of the following two conditions:

1. He indicated that no one in his family received SSDI;

2. He had at some time applied for early retirement benefits.

Persons who did not receive OASI or SSDI and did not otherwise indicate that they were retired were assigned to the labor force participation category.

[12]NT is defined as the sum of 1977 earnings, other 1977 income of all family members, gifts from others, plus 1977 family income from the following sources: employer group insurance, sick pay, individual insurance, employer disability insurance, disability pensions, retirement pensions plus annuities. T is defined as the sum of social security, Supplemental Security Income, railroad benefits, veterans' benefits, unemployment compensation, workers' compensation, Aid to Families with Dependent Children, public assistance, and other transfers.

[13]For the T variables, selectivity bias is not a problem, as virtually everyone in the sample has transfer income. This is not the case for NT, as sizable proportions of each group did not record such income, as follows: WORK, 20 percent; OASI, 34 percent; SSDI, 47 percent. The probits are reported in Appendix Table A-1.

[14]The four constructed health variables (Mobile, Worn down, Stiff, and Respiratory) are from a principal components analysis on a large number of specific health problems which are recorded in the data. For details of this construction, see Haveman, Wolfe, and Warlick (1984).

[15]See note 13.

[16]The positive sign indicates that both $\hat{T}$ and NT contribute positively to utility across the states and, hence, condition the choice among states for a utility-maximizing individual.

[17]These predicted numbers, and the modified choices simulated in the following discussion, are built up out of the probabilities attached to each individual's predicted choice from the trichotomous conditional logit model. The model yields a predicted probability for each of the WORK, OASI, and SSDI options for each observation. These probabilities, which sum to unity for each observation, are weighted using the population weights from the sample to yield the proportions and numbers shown.

[18]The importance of leisure time in the choice made by those in the OASI option probably explains the lower accuracy of our prediction in that case. Available hours of "true leisure" is, of course, an unobserved variable. We periodically attempted to construct a "true leisure" variable for each of the individuals in each of the options,

reflecting health-related maintenance needs, required travel time to work, and work time. Our constructed variable did not improve the performance of the conditional logit model.

[19]The general form of the conditional logit model is

$$P_{ij} = \frac{\exp(\underline{Z}'_{ij}\underline{\beta})}{\sum_{j=1}^{J} \exp(\underline{Z}'_{ij}\underline{\beta})},$$

where $\underline{\beta}$ is an unknown parameter vector and $\underline{Z}_{ij}$ is a vector of observations. This formulation must be used with variables that vary by alternatives (i.e., $\hat{T}$ and $\widehat{NT}$ in each of the 3 options). Under the alternative assumption that the coefficient, β, is alternative specific (specific to each option; WORK, OASI, SSDI), the selection probabilities become

$$P_{ij} = \frac{\exp(\underline{Z}'_{ij}\underline{\beta}_j)}{\sum_{j=1}^{J} \exp(\underline{Z}'_{ij}\underline{\beta}_j)},$$

which is the multinominal logit general form. Estimation of the parameters in either formulation is carried out by maximum likelihood methods.

[20]The stipulated reduction is in expected total transfer income in the OASI option, and not a reduction in OASI benefits of the stipulated amount. The unavailability of a sufficiently detailed breakdown of individual components of transfer income to enable prediction equations to be estimates for each component dictated this procedure. In the aggregate, a 20 percent reduction in transfer income in the OASI option is consistent with approximately a 40 percent reduction of OASI benefits.

[21]This simulation is consistent with the proposal reported in the press that an earnings supplement of $1000 if 65, $1500 if 66, and $2000 if 67 years of age be implemented to discourage retirement and the receipt of OASDI and SSDI benefits.

[22]The $573 million savings is composed of $559 million in savings due to the 20 percent drop in the amount paid to those who remain on OASI, $25 million savings due to the switch of 1 percent of prior recipients of OASI to the WORK option, and $13 million increase in payments to those who switch to the SSDI option. Similarly the change in total income is primarily due to the 20 percent reduction in payments to those who remain on OASI.

[23]Note that our estimates do not include any behavioral responses (such as increased spouse earnings or increased participation in other transfer programs) for those who remain in an option even though income expectations have fallen in that option.

[24]Our estimate is an extrapolation based on the median earnings supplement of $1500.

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