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An Option Value Approach to Modeling Coordinated Labor Force Participation Decisions of Spouses

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Abstract

This paper develops a model of forward-looking retirement behavior by married couples. Couples are assumed to survey all potential future retirement dates and evaluate the expected pay-off from each potential pair of husband's and wife's retirement dates. In particular, we focus on retirement income from pensions and Social Security, health insurance coverage, and shared leisure. We construct exploratory measures of the potential gains from choosing the husband's and wife's continued work paths. The results are largely in line with theoretical predictions: the greater the potential gain (option value) from a path, the greater the likelihood that the couple chooses that path.

Keywords: spousal retirement, option value

JEL Classification:

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1. The Issue

The composition of the American labor force has changed markedly in the past three decades. First, the age distribution of workers shifted towards older workers. This is, of course, largely due to the large size of the baby boom cohort that was born between the late 1940s and the early 1960s. Second, married women entered or remained in the workforce in far greater numbers than before. The labor force participation rate of married women age 45-64 was 36.0 percent in 1960 and increased to 66.1 percent in 2001 (Statistical Abstract 2000, 2002). As a result, more dual-earner couples than ever before are approaching retirement. In the Health and Retirement Study (HRS), both the husband and wife of 83 percent of couples were working at age 45; at age 50, both spouses were working of 77 percent of married couples.

The large size of the cohort that is now approaching retirement poses new problems for policymakers. Will upcoming retirees have accumulated sufficient assets and claims on pension rights to support their increasingly long retirement periods? Will upcoming large-scale dissaving squeeze the nation's credit markets, thus reducing investments and productivity growth? Will the increasing dependency ratio force cuts in pay-as-you-go retirement schemes such as social security, thus creating an increasing reliance on occupational pensions? How will the future smaller workforce produce enough goods and services to provide for the growing group retirees? More than ever, policymakers need to understand what determines workers' labor force participation decisions. Such insights can help design effective incentives to avert adverse consequences of the retiring baby boomers.

Husbands and wives are known to often retire around the same time. For example, Hurd (1990) found that 25-30 percent of the husbands and wives in his 1982 sample retire within one year of each other. Gustman and Steinmeier (2000) and Blau (1998) arrived at similar results using other data sources. Coile (1999) found a joint retirement rate of only 8 percent, but her data panel, the 1992-98 HRS, was short.

The correlation of spousal retirement timing may be due to several factors. Some such factors point at joint decisionmaking by the couple: Husbands and wives may enjoy each other's company, i.e., leisure time may be worth more when spent with the partner than alone. Alternatively, when poor health of one spouse induces him or her to retire, the other spouse may follow soon to provide care. Other factors would produce correlation even if spouses acted individually: Spouses share the same financial resources, such as assets, retirement income, and possibly health insurance coverage. Also, their preferences for leisure and consumption timing may be similar because of assortative mating. An analysis of the determinants of correlated spousal retirement timing (and their relative importance) will help understand how the large cohort of dual-earner families will be withdrawing from the labor force.

This paper explores the extent to which accrual patterns in retirement income from pensions and Social Security, future health insurance coverage, and shared leisure affect couples' work decisions. We are particularly interested in untangling the various factors that may be responsible for the relative high observed joint retirement rate. Ours is therefore an analysis of retirement behavior, not of general labor force participation.

The remainder of this paper contains the following. Section 2 briefly discusses prior findings in the literature. [It is incomplete.] Section 3 formulates a theoretical perspective; Section 4 specifies its empirical implementation. Section 5 describes the data, including some descriptive statistics. Section 6 presents the results of our econometric model, and Section 7 concludes.

2. Literature

A growing body of literature suggests that husbands and wives make retirement decisions jointly (Pozzebon and Mitchell 1989; Hurd 1990; McCarty 1990; Vistnes 1994; Gustman and Steinmeier 2000; Blau 1994, 1998; Coile 1999). Hurd (1990), Gustman and Steinmeier (2000), and Blau (1998), using data from the 1982 New Beneficiary Survey, the NLS for Mature Women, and the RHS, respectively, all find a high incidence of joint retirement. Hurd (1990), for example, finds that 25-30 percent of the husbands and wives in his sample retire within one year of each other. Despite the obvious reality of joint retirement, its existence has been largely ignored in simulations of the effect of changes in private pension rules and social security policy. Indeed we know of only one paper, Coile (1999), that attempts to account for joint retirement in policy simulations. [Also Gustman & Steinmeier, JpubEcon 2003/4] Her paper is based on the HRS through 1998 (1996 and 1998 in preliminary form), when many couples still had one or both spouses in the labor force. As labor force participation of older women rises, the impact of their pension and social security incentives on male retirement decisions, and vice versa, is likely to increase, making this an issue of growing importance. [Discuss Gustman and Steinmeier's Family Retirement paper, J Pub Econ. Discuss evidence of role of pensions, health insurance.]

3. Theoretical framework

We view a couple as a unit that decides on the optimal retirement ages of both husband and wife. Couples are assumed to have a single utility function that is not necessarily separable in husband's and wife's leisure. In other words, the marginal utility of a spouse's leisure may depend, among others, on whether the leisure is enjoyed jointly with the other spouse. It may also depend on the quality of the marriage.

Consider a couple of which both the husband and the wife are working at time t. The spouses need to decide on their labor force participation at time t+1. Before making this decision, the couple is assumed to survey all pairs of potential future retirement dates for husband and wife. Each pair of potential retirement dates determines future utility values. In particular, a pair of retirement dates has implications for future leisure, income flows (from labor, Social Security, and pensions), and health insurance coverage (from own employer, the spouse's employer, a former employer through retiree coverage, and Medicare). We assume the couple determines which pair of retirement dates results in the highest expected present value of all future utility flows (highest lifetime utility). In the absence of uncertainty, the couple will decide that its members continue working until their respective optimal retirement age.

We use the following notation. A_H and A_W are the husband's and wife's ages, respectively, at the time of the decision. R_H and R_W are the husband's and wife's ages, respectively, that correspond to an arbitrary pair of retirement dates. $V\left(R_H, R_W\right)$ is the lifetime utility that would result from

retiring at (R_H, R_W). The optimal retirement ages R_H^* and R_W^* are found by solving

$$V(R_H^*, R_W^*) = \arg\max_{R_H, R_W} V(R_H, R_W).$$

4. Empirical Implementation

Consider a dual-earner couple. Its labor force decision for the next period allows for four avenues:

(0) Both spouses retire;

(1) The wife retires, the husband continues working;

(2) The husband retires, the wife continues working; or

(3) Both spouses continue working.

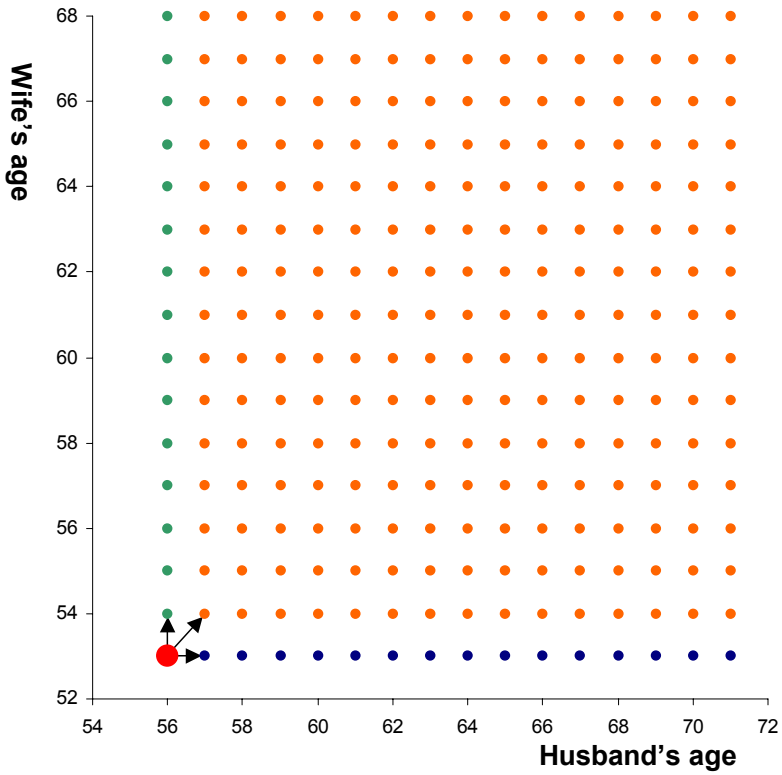

Figure 1. Labor Force Participation Choices for Spouses

Figure 1 illustrates this choice for a husband of age $A_H = 56$ and a wife of age $A_W = 53$. Their initial status is given by the red dot. Under avenue (0), both spouses retire, so that $R_H = A_H$ and $R_W = A_W$. The corresponding lifetime utility is given by $V(A_H, A_W)$. We assume that the retirement decision is irreversible, i.e., retirees cannot re-enter the labor force. Under avenue (1), illustrated by the horizontal arrow, the wife retires ($R_W = A_W$) and the husband may retire at any age $R_H > A_H$. This avenue leaves open retirement at any blue-colored point straight east of the initial status. In this range, the maximum lifetime utility is $\arg\max_{R_H > A_H} V(R_H, A_W)$. In other words, relative to immediate retirement by both spouses, this avenue permits a gain in expected lifetime utility of $\arg\max_{R_H > A_H} V(R_H, A_W) - V(A_H, A_W)$. This quantity is known as the option value (OV) of postponing retirement (Stock and Wise, 1990). Under avenue (2), illustrated by the horizontal arrow, the couple takes an option on realizing an additional lifetime utility of $\arg\max_{R_W > A_W} V(A_H, R_W) - V(A_H, A_W)$. Avenue (3), finally, illustrated by the diagonal arrow, leaves open any retirement in the orange area characterized by $R_H > A_H$ and $R_W > A_W$. The option value of this avenue is $\arg\max_{R_H > A_H, R_W > A_H} V(R_H, R_W) - V(A_H, A_W)$.

We implement the four-way choice with a multinomial logit model. Immediate retirement by both spouses is the omitted category; the potential lifetime utility gains (option values) of each choice are explanatory variables. Our main interest is in the roles of pension plans, health insurance, and (shared) leisure in spouses' labor force coordination decisions. Our (indirect) utility is therefore a function of retirement income (from pensions and Social Security), health

insurance coverage, and leisure. In this exploratory stage, we treat these factors separately, that is, we assume that utility is separable in these three terms and that the gains in each of the three terms may have independent effects. We propose a very primitive and ad hoc formulation of utility terms.[1] Specifically, we estimate the following model.

$$\begin{cases} V_0 = 0 \\ V_1 = \alpha_1 OV_1^P + \beta_1 OV_1^{HI} + \gamma_1 OV_1^L + u_1 \\ V_2 = \alpha_2 OV_2^P + \beta_2 OV_2^{HI} + \gamma_2 OV_2^L + u_2 \\ V_3 = \alpha_3 OV_3^P + \beta_3 OV_3^{HI} + \gamma_3 OV_3^L + u_3 \end{cases}$$

The couple chooses avenue *j*, where $V_j = \max(V_0, V_1, V_2, V_3)$.[2] This is a work continuation model, not a retirement model: the omitted category is avenue (0) (both spouses retire), and V_1, V_2, and V_3 represent the attractiveness of going down avenue (1), (2), and (3), respectively. Option values OV_j^P refer to pension and Social Security income, OV_j^{HI} refers to health insurance coverage, and OV_j^L refers to leisure. For any individual, the period "utility" from pensions and Social Security is zero before retirement; after retirement, the utility consists of π_1 "points" for claiming early Social Security benefits (if retired before age 65 and currently at least 62 years old), π_2 points for claiming full Social Security benefits (if retired at or after age 65), π_3 points for early pension benefits (if retired within two years after reaching the early retirement age of one's defined benefit plan), and π_4 points for full pension benefits (if retired within two years of reaching the full retirement age of one's defined benefit plan). The period

[1] Our goal is to eventually unify factors that contribute to couples' utility into a single utility function. The current approach is very much exploratory.

[2] Once one spouse but not the other retires, the other spouse continues to face work continuation decisions. This individual decision reverts to a simple logit. The coefficients of this logit are constrained to $(\alpha_1, \beta_1, \gamma_1)$ for the

"utility" of couples is the sum of the husband's and the wife's utility. Formally, for individual *H*:

$$u_H^P(t \mid R_H) = \begin{cases} 0 & \text{if } A_H(t) < R_H \\ \pi_1 I\left(R_H < 65 \text{ and } A_H(t) = 62,63,64\right) + & \\ \pi_2 I\left(R_H \geq 65\right) + & \\ \pi_3 I\left(R_H - ERA_H = 0,1,2\right) + & \\ \pi_4 I\left(R_H - NRA_H = 0,1,2\right) & \text{if } A_H(t) \geq R_H \end{cases}$$

where $A_H(t)$ is the husband's age at time *t*, and ERA_H and NRA_H are the early and full (normal) retirement ages, respectively, and $I(.)$ is the indicator function.[3] While not expressed in the equation, plans in which the early and full retirement ages are equal can contribute only $\max(\pi_3, \pi_4)$. We arbitrarily choose $\pi_1 = 1$, $\pi_2 = 1.25$, $\pi_3 = 1$, and $\pi_4 = 1.25$. We calculated "lifetime" utility as the present value of utility flows of the future 10 time periods, discounted at a discount rate ρ of 4 percent. One time period measures two years, corresponding to the interview intervals of our data, the 1992-2002 Health and Retirement Study (HRS). The couple's horizon is thus assumed to be 20 years. For example,

$$OV_1^P = \underset{R_W > A_H}{\arg\max} \sum_{t=1}^{10} \left(\tfrac{1}{1+\rho}\right)^t \left(u_H^P(t \mid A_H) + u_W^P(t \mid R_W)\right) - \sum_{t=1}^{10} \left(\tfrac{1}{1+\rho}\right)^t \left(u_H^P(t \mid A_H) + u_W^P(t \mid A_W)\right)$$

With similar arbitrariness, we assumed that the period "utility" from health insurance coverage is $\eta_1 = 1$ if either spouse is covered and $\eta_2 = 4$ if both spouses are covered. Health insurance

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wife's continuation equation and $(\alpha_2, \beta_2, \gamma_2)$ for the husband's. Similarly, we incorporate into the model retirement decisions by individuals whose spouse is unemployed, disabled, or out of the labor force.

[3] The accrual patterns of defined contribution plans does not exhibit any spikes and thus has little effect on retirement timing. We therefore ignore defined contribution plans in this analysis.

coverage may stem from own employment, spousal employment, prior employment with retiree coverage, or Medicare.[4]

The option value of leisure is simpler. The only relevant factor is whether the spouse is at home, so that a transition into retirement leads to shared leisure for the remainder of the spouses' lives. If the spouse is partly retired, we assign a value of $\lambda_1 = 1$; if s/he is fully retired, unemployed, disabled, or out of the labor force, we assign a value of $\lambda_2 = 2$. While we have presented the model in terms of option values, the leisure terms in the empirical multinomial logit model are simple regressors. Avenue (3), in which both spouses continue working, implies that neither will be at home (or at most part of the time), so that $\gamma_3 OV_3^L$ is omitted from the empirical model.

5. Data

Our analysis is based on the 1992-2002 waves of the Health and Retirement Study (HRS).[5] We define couples as two individuals who are married or cohabiting. Since we measure retirement as a transition between waves, we require that couples have participated in at least two interviews. Both spouses must have been respondents. The unit of observation is a couple-wave.[6] We further restrict the sample to couples with both spouses working full-time at baseline.

[4] The HRS does not collect information on eligibility criteria for retiree health coverage. According to the Kaiser/Hewitt 2002 Retiree Health Survey, two-out-of-three plans apply both an age and a tenure requirement. The most common minimum age-and-service requirement for pre-65 retirees is age 55 with 6-10 years of service (32 percent), followed by age 55 with 11-15 years of service (11 percent). We applied age 55 with ten years of service.
[5] The 2002 wave is Early Release V1.0.
[6] More precisely, the unit of observation is a couple as observed between two interview waves. A couple may contribute up to five observations (1992-94, 1994-96, 1996-98, 1998-2000, 2000-02). They are treated as statistically independent. The estimates of standard errors presented below are Huber-corrected (robust).

There are 1,897 such couples in our sample. We model their 3,537 dual-worker and 2,266 single-worker choices (while one spouse is not working).

Retirement is not a well-defined concept and may be measured in many different ways. The HRS collects information on labor force status, retirement status, whether work-for-pay, and hours/weeks worked. Many responses are paradoxical. For example, it is not uncommon for individuals to report that they are both retired and working full-time. The analyst's optimal definition of retirement depends on the purpose of the analysis. Models that aim to demonstrate the effects of pension incentives may be best served with a definition that is based on job separation, perhaps irrespective of subsequent labor market activity. For models that aim to highlight the role of shared leisure, one might consider expanding the definition of retirees to include the unemployed, the disabled, homemakers, and to those otherwise out of the labor force. We experimented extensively with various definitions and found that, at least in this exploratory phase, the results were robust to choice of retirement definition. The results below rely on self-reported partial or complete retirement, including in cases where the respondent also reported being part-time employed, unemployed, disabled, or out of the labor force.[7] However, we classified full-time employees as not retired, even if they also reported being retired. The risk pool consists of part-time and full-time employees; we excluded self-employed individuals from the risk pool. We defined retirement as the transition from full-time or part-time work to complete or partial retirement.

[7] The subjective nature of retirement implies that part-time workers who claim to be partly retired are classified as retired, whereas other part-time workers are classified as working and thus remain in the risk pool.

Table 1. Timing of Retirement of Husbands and Wives

	Wife						
Husband	1992-94	1994-96	1996-98	1998-00	2000-02	Missing	Total
1992-94	**26**	13	18	9	7	63	136
1994-96	14	**34**	16	10	15	70	159
1996-98	7	14	**34**	9	13	52	129
1998-00	3	7	10	**23**	18	69	130
2000-02	2	5	11	9	**29**	100	156
Missing	33	38	35	46	54	0	206
Total	85	111	124	106	136	354	916

Many couples in our sample were still working at the last survey wave in which they were interviewed. For the 916 couples of which at least one spouse retired between 1992 and 2002, Table 1 shows the timing of retirement of husbands and wives. We observed retirement transitions of both spouses for only 356 couples. For the remaining, one spouse's retirement was missing. This may be because the spouse had already retired before the first interview, was still working at the last interview, or was ineligible for our retirement definition due to unemployment, disability, etc. Defining joint retirees as spouses who retire between the same waves, the bold-faced entries along the diagonal of the table illustrate the incidence of joint retirement. In total, 146 couples were observed to retire between the same survey waves. The incidence of joint retirement was thus 16 percent.[8]

A simple Pearson χ^2-test indicates that joint retirement is far from random. To illustrate the extent to which joint retirement exceeds a random pattern, we separated all couples and randomly re-assigned new spouses (subject to the constraint that the new spouse have the same

[8] This incidence is on the low end of the range reported in the literature. Some authors consider only couples that both retired during the period of observation. That definition would imply a joint retirement rate of 41 percent. However, we believe the denominator should include all couples of whom at least one spouse retired. Moreover, our definition of retirement excludes the unemployed, the disabled, and some others from the risk pool of potential

sex and age as the actual spouse). The joint retirement rate among reshuffled couples was 4.3 percent, i.e., couples are four times more likely to retire around the same time as two random individuals.

We should point out that non-joint retirement may be perfectly compatible with optimal joint decisionmaking. For example, the couple may decide that it is optimal for one spouse to retire while the other continues working in order to become eligible for a pension or obtain family health insurance. It would thus be wrong to conclude that only 16 percent of couples jointly choose their retirement timing. We now turn to the measurement of two potentially important determinants of retirement behavior: pension health insurance coverage.

The HRS collects very extensive information on pension coverage. Respondents are asked about up to three or four pension plans on previous jobs and another three or four on the current job (if working). Depending on the type of pension (defined benefit or defined contribution), detailed questions probe into eligibility criteria and generosity of benefits. Among others, defined benefit plan participants are asked about their plan's early retirement age, its full retirement age, the age at which they expect to draw benefits, and the expected benefit level at each of those ages. The level of detail is lower if the respondent indicates that nothing had changed in his or her pension coverage since the previous interview. Unfortunately, the item non-response rate on pension details is high. For example, 10 to 20 percent of defined benefit plan participants did not provide a full retirement age; about one-half did not venture an estimate of benefits. Moreover, there is ample evidence that responses are often incorrect. For example, among respondents with one

retirees. They can therefore not contribute to the numerator, but they do contribute to the denominator if they were working at baseline.

pension plan on their current job and who reported that there had been no change in their plan since the previous interview, 29 percent reported different plan types in the two interviews. An unknown fraction of respondents reported consistent but incorrect plan types. Self-reported pension information in the HRS is thus incomplete and of suboptimal quality.

The HRS also collected pension plan information from current and previous employers of HRS respondents. This information is often considered of higher quality, because it is based on summary plan descriptions. However, employer-provided pension information has its own set of issues. First, not all respondents gave permission to contact their (former) employer, and not all contacted employers provided information. In the 1992 HRS, 4,496 respondents claimed pension plan coverage; the employer-provided pension data contain only 2,396 respondents. The high rate of missing individuals' responses is even higher at the couple level, where we conduct the analysis. Second, employers often administer multiple plans and it is not always evident which plan covers the respondent. Third, employer-provided pension information is available only for the 1992 wave (and, very recently, for some in the 1998 wave).

Our analysis relies on self-reported pension information. In this exploratory stage, our focus is on the timing of peaks in the accrual pattern, i.e., in early and full retirement ages. A respondent who reports being covered by a defined benefit plan but does not know the early or full retirement age is unlikely to respond to the incentive embedded in accrual peaks. We therefore treat such persons as if they are not covered by a pension plan. We do not impute retirement ages.

Table 2. Retirement Year Relative to Defined Benefit Retirement Age (for plans without early retirement benefits)

	Freq.	Percent	Cumulative
10+ years before eligibility	11	1.6	1.6
-9	5	0.7	2.3
-8	11	1.6	3.8
-7	7	1.0	4.8
-6	11	1.6	6.4
-5	14	2.0	8.4
-4	22	3.1	11.5
-3	25	3.5	15.0
-2	45	6.4	21.4
-1	26	3.7	25.1
0	83	11.8	36.8
1	105	14.9	51.7
2	92	13.0	64.7
3	49	6.9	71.7
4	48	6.8	78.5
5	22	3.1	81.6
6	37	5.2	86.8
7	31	4.4	91.2
8	20	2.8	94.1
9	13	1.8	95.9
10+ years after eligibility	29	4.1	100.0
Total	706	100.0	

There is strong evidence that respondents tend to retire shortly after reaching their defined benefit plan's early or normal retirement age. Table 2 shows the distribution of retirement age for individuals covered by a defined benefit plan that does not offer early retirement benefits, relative to the plan's full retirement age. As shown in the table, 39.7 percent retire within two years after reaching the plan's retirement age. Our measure of retirement age is crude; it is the age at the interview in which the respondent first reported being retired. Since interviews are about two years apart, this may exceed the actual retirement age by as much as two years. In other words, about 40 percent retire shortly after becoming eligible for benefits. For married men and women, the fractions are 44 and 34 percent, respectively. Couples may be willing to deviate more often from the wife's optimal retirement age than from the husband's, because the

financial implications are smaller. The lower fraction for married women may reflect their lower anticipated benefits—the average monthly benefit for married women is 72 percent of the average for married men. Somewhat surprisingly, only 25 percent of unmarried individuals retire shortly after becoming eligible for benefits. This may be related to their poorer health: 25.1 percent of unmarried respondents reported a health condition that limited the kind or amount of work they could carry out, compared with 20.8 percent of married respondent.

The HRS also collects information on health insurance coverage. Both husbands and wives are asked whether they are covered through their own employer (or union) and/or their spouse's employer. If their own employer provides coverage, they are asked about retiree coverage.[9] Our analysis takes account of health insurance from (former) employers, unions, and Medicare only. We ignore such sources as Medicaid.

6. Results

Table 3 shows the parameter estimates of our multinomial logit model of work continuation choices. The three panels correspond to the three equations for V_1, V_2, and V_3; they may be interpreted as the relative attractiveness of opting for the wife's immediate or continued retirement while the husband keeps working, the husband's immediate or continued retirement while the wife keeps working, and both spouses' continued work, respectively. The explanatory covariates in each panel are measures of the option value associated with retirement income

[9] The question wording varies. In early waves, respondents are asked whether their health insurance plan is available to retirees; in later waves whether coverage remains available through age 65. Also see footnote 4 on page 9.

(pensions and Social Security), the option value associated with health insurance coverage, and shared leisure.

Table 3. Parameter Estimates of Work Continuation Choices (Multinomial Logit)

	(1)	(2)
Attractiveness (1): wife retires, husband continues		
Constant	0.8363 ***	0.8535 ***
	(0.0968)	(0.0948)
OV retirement income	0.1195 ***	0.1191 ***
	(0.0159)	(0.0158)
OV health insurance	0.0216 **	0.0214 **
	(0.0106)	(0.0106)
Wife at home	0.0347	
(0=not; 1=part-time; 2=full-time)	(0.0750)	
Wife at home * Importance of sharing time		0.0047
(1=not at all; 4=very important)		(0.0210)
Attractiveness (2): husband retires, wife continues		
Constant	1.3207 ***	1.3339 ***
	(0.0812)	(0.0801)
OV retirement income	0.1315 ***	0.1319 ***
	(0.0149)	(0.0149)
OV health insurance	0.0655 ***	0.0649 ***
	(0.0099)	(0.0099)
Husband at home	-0.1824 ***	
(0=not; 1=part-time; 2=full-time)	(0.0650)	
Husband at home * Importance of sharing time		-0.0577 ***
(1=not at all; 4=very important)		(0.0180)
Attractiveness (3): both continue working		
Constant	2.2667 ***	2.2794 ***
	(0.1010)	(0.1003)
OV retirement income	0.1348 ***	0.1350 ***
	(0.0107)	(0.0107)
OV health insurance	0.0991 ***	0.0989 ***
	(0.0073)	(0.0073)
ln-L	-3,406.01	-3,405.00

Notes: Asymptotic standard errors in parentheses;
Significance: '*'=10%; '**'=5%; '***'=1%;
All standard errors are robust (Huber-corrected).

Consistent with our expectations, all option value coefficients are positive and strongly significant. In other words, the more that can be gained from choosing a path, the more likely couples are to choose it.

The results for shared leisure are mixed. For the attractiveness of continued work by only the husband and only the wife, the first model simply controls for whether the other spouse is currently at home. Our hypothesis is that continued work is less attractive if the other spouse is at home, because continued work implies that the option of shared leisure is not (yet) taken. Consider the first panel, which reflects the attractiveness of continued work by only the husband. Whether the wife is at home is one of the determinants of that attractiveness. Its value may be zero if she is not at home, one if she is at home part of the time (while she is partly retired), and two if she has no work activities (while fully retired, unemployed, disabled, or out of the labor force).[10] The results indicate that whether the wife is home has no significant effect on the propensity of the husband to continue working. By contrast, the mirror image does play a role: if the husband is at home, the wife is significantly less likely to continue working.

The appeal of shared leisure may vary with marriage quality. The second model therefore includes a measure of marriage quality. In the 1992 HRS interview, working individuals were asked the following:

> *I am going to read you a list of things that some people say are good about retirement. For each one, please tell me if, for you, they are very important, moderately important,*

[10] We have been characterizing avenue (1) as immediate or continued retirement by the wife, so that she should always be home at least part of the time. However, we included couples in the analysis of whom the wife was self-employed. For such couples, we only modeled the husband's work continuation decision. Wives that were full-time self-employed were not at home.

somewhat important, or not important at all. […] Having more time with (husband/wife/partner).

The second model interacts the potential for shared leisure with this measure of marriage quality. We recoded the variable such that higher values indicate better marriages (1 if not important at all through 4 if very important). In the equation for the attractiveness of the husband's continued work, we interacted the variable for whether the wife was at home with the husband's assessment of the importance of spending more time with his wife. In the second panel, we interacted the variable for whether the husband was at home with the wife's assessment of the importance of spending more time with her husband. The results did not change qualitatively: the prospect of shared leisure had no significant effect on the likelihood of husbands' continued work, but it did increase the chances of retirement by wives.

7. Conclusion

We developed a model of forward-looking retirement behavior by married couples. The empirical implementation is still exploratory. It includes measures of potential gains from continued work (option values) associated with income from pensions and Social Security, health insurance coverage, and shared leisure. The results are largely in line with theoretical predictions. The next steps will be to incorporate future determinants of couples' utility in a more sophisticated manner, and to address uncertainty issues.

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