The Rise in Female Labor Force Participation and the Decline in Male Retirement Age

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Abstract

The significant decrease in the labor force participation of older men remains a puzzle, despite many studies that have analyzed the role of Social Security and pension incentives. This paper examines whether the population trends of rising labor force participation among women and earlier retirement among men are present at the household level. The results indicate that a husband's retirement hazard increases with the accumulated value of his wife's career earnings. Simulations suggest that the increase in married women's earnings from 1965 to 2000 could account for approximately 17 percent of the earlier retirement experienced by men during this period.

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1 Introduction

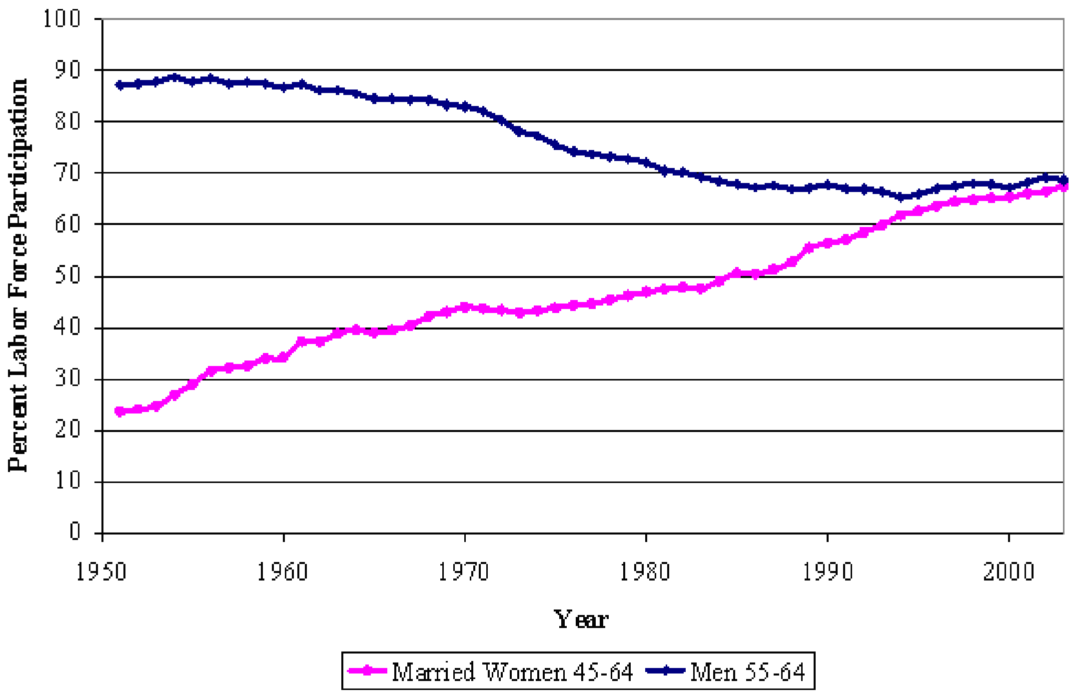
The earlier retirement of men in the latter half of the 20th century is well-documented. Despite the fact that people are increasingly healthier at older ages, individuals are working less and spending more time in retirement. The labor force participation rate for men aged 55 to 64 years dropped from 89.5 percent in 1948 to 65.5 percent in 1994 and has stabilized in recent years.[1] The median retirement age dropped from approximately 65.5 in 1965 to 62.5 in 2003, and the accompanying improvements in life expectancy over this period have reinforced the effect of earlier exits from the labor force, lengthening the duration of retirement by approximately 50 percent.

During roughly the same time period, female labor force participation increased dramatically, more than making up for the decline experienced by men. In 1948, only 32.7 percent of women age 16 and over participated in the labor force; by 2003, the percentage had almost doubled to 59.5 percent. The increase in labor force participation was concentrated among married women, as single women had high labor force participation rates before this transition occurred. Among women aged 45-64, the labor force participation rate for single women was approximately 70 percent during 1951-2004. Labor force participation among married women in the same age group grew from 23.7 percent in 1951 to 67 percent in 2004, approaching the rate of single women. Figure 1 shows the labor force participation rates experienced by men aged 55-64 from 1951 to 2003 and married women aged 45-64 over the same time period. Recent labor force participation rates have been relatively stable, which may imply that the transition period is coming to an end.

The significant drop in the male retirement age has motivated a large literature on the impact of Social Security and private pensions on male retirement, using a variety of modeling techniques and datasets to examine these relationships. Generally, these studies have found significant but modest changes in retirement behavior due to Social Security, and

[1] These and the labor force participation statistics that follow are from Steven Haugen at the Bureau of Labor Statistics, calculated from the Current Population Survey (CPS). Labor force participation rates by marital status were taken from the U.S. Census Bureau Statistical Abstracts, years 1954 - 2006.

Figure 1: Labor Force Participation Rates of Men 55-64 and Married Women 45-64



are thus unable to explain the entire decline in male retirement age. However, the result of the concurrent entry of women into the labor force, particularly married women, on male retirement has been largely unexamined.

Consider a family with a target retirement income where the husband is the sole earner in the household. Now imagine that societal changes cause women to be more likely to work outside the home, and his wife enters paid employment. It is possible that the family is now able to reach their target retirement income sooner than they would have otherwise, causing the husband to retire sooner. It is not unreasonable to think that the family "bought" a longer retirement for the husband with the extra assets obtained by the wife working.

There are several other alternatives as to what the income earned by married women allowed the household to do. The husband could have bought leisure earlier in life rather than at retirement, i.e. substituted his wife's earnings for his. Another alternative is that the family purchased more consumption goods as a result of their increased wealth but the husband retired at the same time as he would have otherwise. The complementarity or substitution of husbands' and wives' leisure is also important to the retirement and work decisions of the couple. The net impact of women's earnings on male retirement is therefore an interesting empirical question.

This paper describes the relationship between a wife's earnings and her husband's retirement behavior. Higher accumulated earnings received by married women increase their husbands' hazard rates for retirement and this effect persists after controlling for a variety of characteristics of the husband that may also influence the age at which he retires. Section 2 describes previous literature regarding the retirement decisions of couples and the decline in male labor force participation during the twentieth century. Section 3 describes the data used for this paper and displays summary statistics and unadjusted hazard rates for the sample. Section 4 discusses the model and estimates. Section 5 provides an interpretation of the results of this paper in the context of historical labor force participation rates, and Section 6 concludes.

2 Literature Review

The dramatic shifts in retirement age by men in the latter half of the twentieth century has spurred several important strands of literature. Many studies have analyzed the effect of Social Security on retirement incentives as one possible reason for the earlier exit from the labor force using a variety of methods and data. Early studies, including Hurd and Boskin (1984) and Diamond and Hausman (1984), focused on reduced-form models of the effect of Social Security wealth on retirement. As pointed out in Coile (2004), these models may not accurately represent forward-looking behavior towards retirement. Despite the limitations of these models, the results suggest a small but significant effect of Social Security's expansions in benefits on earlier retirement behavior.

Later studies developed techniques to deal with these issues, either by incorporating the

Social Security wealth accrual from additional years of work into reduced-form models (e.g. Fields and Mitchell (1984), Hausman and Wise (1985)) or by developing structural models of retirement (e.g. Burtless (1986), Gustman and Steinmeier (1985)). Another approach was to use an option value framework where it is assumed that workers delay retirement to the age that maximizes their utility. Stock and Wise (1990) develop a structural model of this type and estimate the response to retirement incentives for a sample of workers from one firm, and Coile and Gruber (2004) estimate reduced-form versions of the option value model and their "peak value" model using the HRS. Both Stock and Wise (1990) and Coile and Gruber (2000) account for forward-looking behavior, and find that workers do respond to labor supply incentives in Social Security. Blau and Goodstein (2007) examine several potential explanations of changes in men's retirement ages, including changes in Social Security rules, lifetime earnings, pension coverage, wages, health, health insurance, and educational attainment and find that these explanations are unable to account for the decline in labor force participation rates among older men.

The hypothesis that the increased labor force participation of women may lead to earlier male retirement assumes that leisure during retirement is a normal good; however, there has been some debate as to whether workers demand a longer retirement as their wealth increases. Some studies (Hurd and Reti (2001), Coronado and Perozek (2003), Sevak (2005)) use the run-up in stock market wealth from the late 1990s to examine the question of whether higher wealth causes earlier retirement with mixed results. Hurd and Reti (2001) find no evidence suggesting that households with large stock market gains retired earlier than they had previously anticipated compared to similar households that did not hold equity. By contrast, Coronado and Perozek (2003) and Sevak (2005) find large effects of wealth on retirement behavior comparing households with large stock market gains relative to those with small gains. Samwick (1998) finds that there is little tendency for workers with high financial wealth to retire early, but that higher retirement wealth can lead to earlier retirement. Joulfaian and Wilhelm (1994) find little effect of inheritance on labor supply, but Brown, Coile, and Weisbenner (2006) find that inheritance receipt increases the probability of retirement. Farnham and Sevak (2007) also find that an increase in housing wealth reduces the expected retirement age.

Another literature also relevant for this paper is that on retirement behavior of couples. A significant portion of married couples are observed retiring simultaneously, particularly if the husband and wife's ages differ by fewer than three years (Johnson 2004). Consistent with this empirical fact is that workers with younger spouses tend to retire later (Johnson 2004). Having a retired spouse also increases the likelihood of retiring; the effect is more significant for men than for women (Gustman and Steinmeier 2004). Simultaneous retirement is likely due to complementarities in leisure between the husband and wife, as joint retirement is more common in cases where one spouse reports that spending time with the other is a "very important" benefit of retirement. Health status also plays a role: Johnson and Favreault (2001) find that in situations where one spouse suffers a health shock and can no longer work, husbands and wives are less likely to retire together. Coile (2004) looks at spillover effects of one spouse's retirement incentives on the other spouse's retirement behavior. She finds that an increase in the return to work for the wife makes her husband less likely to retire (holding other characteristics constant), but that wives do not have a corresponding response to their husbands' retirement incentives. Schirle (2007) seeks to explain the rising trend of male labor force participation from 1995-2005, and finds support for the hypothesis that men retire *later* when their wives are working due to complimentarities in leisure. However, the author is able to observe only the current labor force status of the spouse rather than the entire career history.

This study complements the existing literature by examining an unexplored potential factor in the earlier retirement behavior by men over the last several decades, and by analyzing another facet of increased labor force participation among women. While the two trends are correlated in the aggregate time series, by evaluating the relationship at the micro level, we can better understand whether higher levels of earnings among women is associated with higher retirement hazards for their husbands. By using a hazard rate analysis, it is possible to determine the increased retirement hazard from a high level of accumulated earnings by the wife without assuming a functional form for the baseline hazard rate.

3 Data and Descriptive Statistics

The data used in the analysis is the Health and Retirement Study (HRS), sponsored by the National Institute on Aging. The HRS began as a biannual panel study on respondents age 51-61 in 1992 (born in 1931-1941) and their spouses. A separate sample, denoted as Asset and Health Dynamics among the Oldest Old (AHEAD) and consisting of cohorts born before 1923, was surveyed in alternate years until these samples were merged in 1998. At this time, two more samples were added: the War Baby (WB) sample, made up of those born from 1942 through 1947, and the Children of the Depression Age (CODA) sample, containing cohorts born from 1924 through 1930 (i.e. the missing birth cohorts between the HRS and AHEAD samples). All samples were merged for the purposes of this paper; therefore, the analysis includes cohorts born in 1947 and earlier, plus the spouses of respondents who may be outside this range. The respondents and their spouses were interviewed every two years, and six waves of data are used in the analysis. The survey contains a large amount of information regarding demographics, health status, family structure, housing, work history and current employment, disability, retirement plans, net worth, income, and health and life insurance on 7,223 couples and 1,903 single males. The analysis uses one observation per couple, and retirement age is based on the self-reported labor force status throughout the survey. In the duration model that follows, several observations are right-censored due to either death before retirement or continued participation in the labor force during the most recent wave of the survey. These censored observations are handled appropriately in the analysis by the use of a "failure" variable that indicates whether the individual is retired in the computation of hazard rates.

The first part of the analysis uses variation in the wife's self-reported career length to identify effects on the retirement hazard of husbands. The number of years worked is based on all reported jobs (both those where respondents were working at the time of interview, and those reported in the retrospective job history). Because of the dramatic increase in the labor force participation of women which took place during the working years of the cohorts surveyed, there is a large amount of variability in how long the wife spent in the labor force.

Control variables that are used throughout the paper include: race variables (binary variables for *African American*, *Hispanic*, and *Other*); health insurance variables (whether the husband is covered by retiree health insurance provided by his employer or his spouse's employer); education binary variables for less than high school, high school completion, and college completion; a self-reported variable that indicates whether the husband was in fair or poor health status during the last interview; and binary variables for the 5-year birth cohort in which the husband was born. The mean and standard deviations for these control variables by the career length of the wife are shown in Table 1. One of the more striking observations from this table is that husband's education varies substantially with wife's career length. About twenty-five percent of husbands whose wives did not participate in the labor force had a college degree, while more than forty percent of husbands in households where the wife worked 10 years or more finished college. Husbands of non-working wives are far more likely to be Hispanic, and to be in fair or poor health. These husbands were also less likely to be offered retiree health insurance from an employer. Gruber and Madrian (1995) show that having retiree health insurance significantly increases retirement hazards because these workers need not wait for retirement until Medicare eligibility at age 65, making it important to control for the observed differences in retiree health insurance availability.

The second part of the analysis uses variation in the total accumulated earnings received by the wife during her career, as reported by Social Security administrative earnings data. These data are restricted and not public use, and contain annual earnings data from 1951-

Table 1: Summary Statistics by Wife's Career Length

	Non-Working Wife		Wife worked 1-9 Years		Wife worked 10-19 Years	
Variable	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Husband retirement age	62.871	5.293	62.209	5.213	62.067	5.260
Years worked by husband	35.989	15.027	40.160	12.011	39.546	11.743
Years worked by spouse	0.000	0.000	4.813	2.656	14.517	2.970
Husband educ - less than high school	0.473	0.500	0.326	0.469	0.283	0.451
Husband educ - high school degree	0.279	0.449	0.331	0.471	0.303	0.460
Husband educ - college degree	0.248	0.432	0.343	0.475	0.413	0.493
Husband African American	0.100	0.300	0.081	0.273	0.085	0.279
Husband Hispanic	0.206	0.405	0.117	0.322	0.067	0.250
Husband other	0.032	0.176	0.019	0.135	0.016	0.125
Husband bad health	0.476	0.500	0.365	0.482	0.337	0.473
Husband has retiree HI	0.051	0.219	0.093	0.290	0.112	0.315
Age difference	4.108	6.160	3.943	6.000	3.832	5.875
N	632		755		1208	

	Wife worked 20-29 Years		Wife worked 30-39 Years		Wife worked 40+ Years	
Variable	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Husband retirement age	61.809	5.397	61.173	5.042	62.657	5.208
Years worked by husband	40.016	12.039	40.821	10.360	43.420	11.355
Years worked by spouse	24.516	2.853	34.340	2.882	45.549	5.008
Husband educ - less than high school	0.258	0.438	0.207	0.405	0.225	0.417
Husband educ - high school degree	0.318	0.466	0.333	0.472	0.360	0.480
Husband educ - college degree	0.424	0.494	0.460	0.499	0.415	0.493
Husband African American	0.110	0.313	0.132	0.338	0.120	0.325
Husband Hispanic	0.062	0.242	0.048	0.214	0.033	0.180
Husband other	0.020	0.141	0.022	0.147	0.011	0.106
Husband bad health	0.300	0.459	0.284	0.451	0.321	0.467
Husband has retiree HI	0.161	0.367	0.183	0.387	0.110	0.313
Age difference	4.497	5.769	4.040	5.157	2.873	4.922
N	1544		1763		1321	

1991 up to the Social Security taxable maximum for respondents who signed a waiver form allowing HRS to use their earnings information for research purposes. These earnings records only include Social Security taxable earnings and would therefore not include earnings above the taxable maximum or earnings for years where the individual worked in employment not covered by Social Security. However, these administrative data provide the most accurate reflection of earnings available for these workers. Having an entire series of earnings for each person also gives more information as to when the income was earned. After matching wives' earnings histories to their husbands' records, 4,553 couple observations remain.

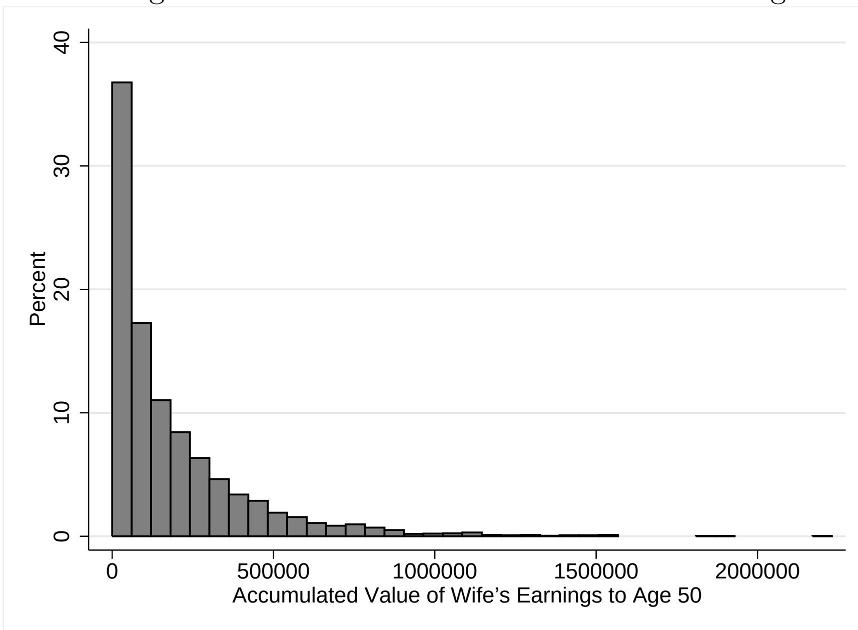
In the empirical analysis, the earnings of the wife are taken as exogenous to the husband's retirement decision. While this may be a plausible assumption for earnings early in the wife's career, labor supply decisions of the wife as the couple approaches retirement age are more likely to be joint decisions. Hence, earnings for each woman are therefore accumulated to age 50, omitting women under age 50 in the analysis to avoid a bias against women who have not yet had the opportunity to accumulate a full earnings history to that age.[2] Couples are then divided into four categorical groups based on the accumulated value of the wife's earnings to age 50.

The first group consists of households where the wife had zero earnings before age 50; there are 182 such couples. The 2,919 wives in the second group had a positive amount of accumulated earnings, but less than $200,000 before age 50. The third group contains 1,055 couples where the wives' accumulated earnings by age 50 was more than $200,000 but less than $500,000, and there are 397 married women in the fourth category who accumulated more than $500,000 in earnings during this period. The distribution of accumulated values to age 50 is shown in Figure 2. Husbands' earnings were also accumulated to age 50 to serve as a control variable in certain specifications in the empirical analysis.

Summary statistics for the five earnings groups are given in Table 2. We see that high-earning women are married to more highly-educated men, similar to the earlier finding

[2]Earnings are accumulated using a six percent annual interest rate.

Figure 2: Histogram of Wives' Accumulated Lifetime Earnings to Age 50



for wives with longer career lengths in Table 1. Overall, the same correlations between husbands' characteristics and career length found previously hold for accumulated earnings: lower percentages of high-earning women are married to Hispanic men, more husbands of women with no earnings are in fair or poor health, and higher percentages of men with retiree health insurance are married to high-earning women. This suggests that the accumulated earnings of women are strongly related to their self-reported career lengths.

Another interesting observation is that the accumulated value of husbands' earnings to age 50 is positively correlated with wives' earnings, giving evidence of assortive mating. If retirement is being thought of as a normal good purchased with the wife's earnings, it is important to not attribute earlier retirement to the wife's earnings when the true effect is from the husband's earnings themselves. In the empirical estimation, specifications controlling for the husband's earnings are also presented.

The unadjusted male retirement hazard rates are shown in Figure 3 by the labor market experience of his wife and the wife's accumulated value of earnings to age 50. The hazards show the probability of an individual who has not yet retired exiting the labor force in a given year. We see the characteristic spikes in retirement hazards at ages 62 and 65,

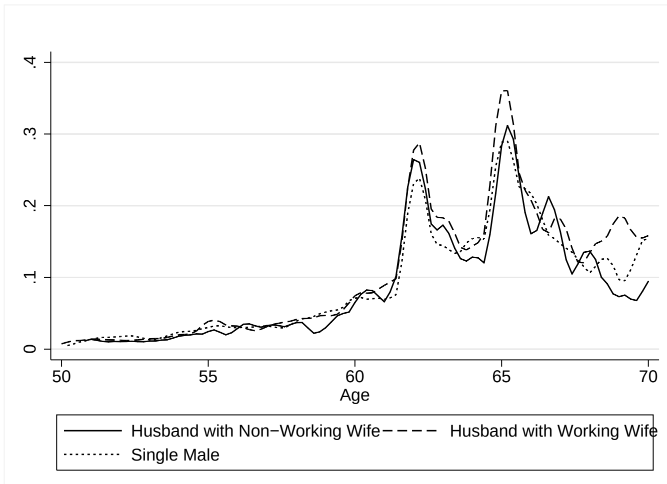
Table 2: Summary Statistics by Accumulated Value of Wife's Earnings to Age 50

	Wife Has Zero Earnings		Wife's Earnings<$200K	
Variable	Mean	Std Dev	Mean	Std Dev
Husband retirement age	63.996	6.219	62.370	5.048
Husband's accumulated earnings to age 50	246,395	302,707	366,088	292,094
Wife's accumulated earnings to age 50	0	0	71,449	56,549
Husband educ - less than high school	0.495	0.501	0.298	0.457
Husband educ - high school degree	0.214	0.411	0.331	0.471
Husband educ - college degree	0.291	0.456	0.371	0.483
Husband African American	0.088	0.284	0.090	0.287
Husband Hispanic	0.203	0.404	0.066	0.248
Husband other	0.038	0.193	0.015	0.122
Husband bad health	0.423	0.495	0.360	0.480
Husband has retiree HI	0.049	0.217	0.097	0.296
Age difference	3.546	5.208	3.147	4.802
N	182		2919	

	$200K<Wife's Earnings<$500K		Wife's Earnings≥$500K	
Variable	Mean	Std Dev	Mean	Std Dev
Husband retirement age	61.225	4.795	59.295	4.417
Husband's accumulated earnings to age 50	562,085	334,010	743,515	392,618
Wife's accumulated earnings to age 50	314,987	82,744	757,982	256,092
Husband educ - less than high school	0.190	0.392	0.106	0.308
Husband educ - high school degree	0.362	0.481	0.292	0.455
Husband educ - college degree	0.448	0.498	0.602	0.490
Husband African American	0.087	0.283	0.134	0.341
Husband Hispanic	0.043	0.202	0.033	0.178
Husband other	0.018	0.133	0.020	0.141
Husband bad health	0.258	0.438	0.229	0.421
Husband has retiree HI	0.194	0.396	0.292	0.455
Age difference	3.789	4.987	4.693	5.074
N	1055		397	

Social Security's early and (until recently) normal retirement age for claiming benefits. It is widely believed that institutional features of Social Security cause these spikes, possibly by creating focal ages of retirement. Retirement incentives embedded in pension plans likely also reinforce these effects.

Figure 3: Unadjusted Retirement Hazards



(a) Husband's Retirement Hazard by Wife's Labor Force Experience

(b) Husband's Retirement Hazard by Wife's Accumulated Value of Earnings to Age 50

Source: Health and Retirement Study, author's calculations

The retirement hazards in the first graph follow the same general shape and pattern with higher hazards experienced by men with working wives. Because the differences in expected retirement ages are difficult to infer from these hazard rate graphs, the implied 25th, 50th, and 75th percentiles of retirement ages for the different groups are summarized in Tables 3 and 4. The survival functions induced by these retirement hazards imply that the median male retiree exited the labor force approximately half a year earlier if his wife participated in the paid labor force. The effect was stronger the longer his wife worked outside the home, with the exception of those couples where the wife worked over 40 years. Single males appear very similar to men without working wives.

The retirement hazard rates by the accumulated value of the wife's earnings show some unusual features. Some groups have hazard rates that increase substantially just before age 70, while others do not. The lowest hazard rates are experienced by men whose wives had zero earnings before age 50. Table 4 shows the median retirement ages for the different groups are monotonically decreasing in the earnings category of the wife. While the sample of husbands differs for the two groups because earnings data were not available for the full sample, both the full sample and the smaller restricted sample linked to earnings data have similar implied 25th, 50th, and 75th percentiles of retirement ages overall. This can be seen by comparing the statistics for "All Males" given in both Tables 3 and 4.

Table 3: Husband Retirement Ages by Wife's Career Length

Category	N	25th Percentile	Median	75th Percentile
Non-Working Wife	632	60.750	63.167	66.833
All Working Wives	6,561	60.083	62.750	65.833
Wife Worked 1-9 Years	755	60.583	62.833	65.833
Wife Worked 10-19 Years	1,208	60.083	62.833	66.000
Wife Worked 20-29 Years	1,544	60.000	62.667	65.917
Wife Worked 30-39 Years	1,763	59.333	62.333	65.333
Wife Worked 40+ Years	1,321	60.750	63.000	66.500
Single Males	1,903	60.000	63.167	66.583
All Males	9,126	60.083	62.833	66.083

Table 4: Husband Retirement Ages by Wife's Accumulated Value of Earnings to Age 50

Category	N	25th Percentile	Median	75th Percentile
Wife Had Zero Earnings	145	61.750	64.167	70.750
Wife's Earnings <200K	2,300	60.500	63.000	66.000
200K<Wife's Earnings<500K	1,149	59.833	62.250	65.417
Wife's Earnings>500K	662	58.333	62.000	65.000
All Males	4,553	60.25	62.750	66.000

4 Cox Proportional Hazard Rate Model and Estimates

The statistics shown above are suggestive of a relationship between both the length of time that a woman participates in the paid labor force and her accumulated earnings, and the retirement hazard of their husbands. To further analyze this relationship, a Cox proportional hazard rate model provides estimates of the effect of married women's career history and accumulated earnings on their husband's retirement hazards, correcting for other covariates which may influence retirement behavior.

The retirement hazard function, $h(t)$, gives the probability that a male who is participating in the labor force will retire at time t. The Cox proportional hazard rate model takes the following form:

$$h_i(t|W,X) = h_0(t)\exp(w_i'\delta + x_i'\beta) \tag{1}$$

where $h_0(t)$ is the baseline hazard, and δ and β are the estimated coefficients of the vector w_i' of binary variables describing the wife's career history (either through her career length or her earnings history) and control variables (x_i'), respectively. The Cox model is semi-parametric in that no underlying functional form for the baseline hazard is needed, but the covariates are assumed to affect the hazard rates at different ages proportionally. The baseline hazard is the underlying retirement hazard rate for an individual with w_i' and x_i' equal to zero. Estimation by maximum likelihood produces estimates of the regression coefficients and their standard errors. The key coefficients of interest are given by the estimates $\hat{\delta}$. The vector of control variables, x_i', contains combinations of health insurance, education, race, and health status variables as indicated in the results table. The model is estimated by maximizing the partial likelihood function

$$L(\delta, \beta) = \prod_{k=1}^{K} \left(\frac{\exp(w_k'\delta + x_k'\beta)}{\sum_{l \in R(t)} \exp(w_l'\delta + x_l'\beta)} \right) \tag{2}$$

where there are K observed exit times and $R(t)$ is the set of all males who have not already retired and are at risk of doing so in time t. Higher estimates for δ and β imply the covariates are associated with higher hazards of retirement, or lower retirement ages.

4.1 The Effect of Married Women's Career Length on their Husband's Retirement Behavior

The first set of estimates, summarized in Table 5, uses a vector of career length binary variables to analyze the effect of career length on retirement age. Here, w_i' contains binary variables for "Wife Worked 1-9 Years," "Wife Worked 10-19 Years," "Wife Worked 20-29 Years," "Wife Worked 30-39 Years," "Wife Worked 40+ Years," and "Single Male." The omitted category is "Wife Not in Paid Labor Force." The reported estimates are the hazard ratio or relative hazard, i.e. the multiplicative factor to the baseline hazard at each duration if the binary variable goes from zero to one. The hazard ratio given a coefficient estimate $\hat{\delta}_i$ is therefore $\exp(\hat{\delta}_i)$. A retirement hazard greater than one indicates a greater probability of earlier retirement relative to the omitted category.

Column (1) of Table 5 contains only indicator variables for the wife's career length, and no other regressors. The estimates of the coefficients on the wife's career length binary variables show a positive effect of the amount of time a married woman spent in the labor force on the retirement hazard of her husband ranging between 15 and 30 percent, leading to lower expected retirement ages. In this specification, the effect of having a wife who spent time in the paid labor force is for their husbands to have a higher retirement hazard relative to a male whose wife did not participate. When control variables for the husband's race,

Table 5: Cox Proportional Hazard Rate Model Using Self-Reported Career Length

	(1)	(2)	(3)	(4)
Wife Worked 1-9 Years	1.178	1.233	1.018	1.069
	[0.071]**	[0.080]**	[0.062]	[0.070]
Wife Worked 10-19 Years	1.134	1.177	1.038	1.082
	[0.062]*	[0.070]**	[0.057]	[0.065]
Wife Worked 20-29 Years	1.18	1.207	1.009	1.058
	[0.063]**	[0.070]**	[0.054]	[0.062]
Wife Worked 30-39 Years	1.292	1.338	1.041	1.105
	[0.068]**	[0.077]**	[0.056]	[0.065]
Wife Worked 40+ Years	1.097	1.138	0.935	0.98
	[0.059]	[0.066]*	[0.050]	[0.058]
Single Male	1.073		1.02	
	[0.054]		[0.052]	
African American		1.002		0.939
		[0.048]		[0.046]
Hispanic		0.984		0.853
		[0.059]		[0.052]**
Other Race		0.994		0.91
		[0.111]		[0.101]
HI: Husband has ER HI		1.742		1.348
		[0.088]**		[0.075]**
Husband education: high school		1.093		1.033
		[0.042]*		[0.040]
Husband education: college		0.959		0.89
		[0.036]		[0.034]**
Husband in fair/poor health		1.122		1.274
		[0.034]**		[0.040]**
Husband-wife age diference		0.985		0.99
		[0.003]**		[0.003]**
Birth Cohort controls			x	x
Observations	9126	6670	9126	6670

Standard errors in brackets
* significant at 5%; ** significant at 1%

education, retiree health insurance availability, health status, and age difference between him and his wife are added in Column (2), a similar effect is shown. However, the addition of birth cohort binary variables in Columns (3) and (4) removes the statistical significance of the career length binary variables.

The effects are not monotonic in the length of time the wife spent in the labor force. For example, the retirement hazard for a husband whose wife worked 10-19 years is not statistically different from a husband whose wife worked 1-9 years (and the point estimate of the hazard is smaller); a husband whose wife worked 30-39 years faces the highest retirement hazards – up to 30 percent higher than the baseline hazard, after controlling for other characteristics. Single males appear to have retirement hazards similar to men whose wives did not participate in the labor force.

The hazard ratios for the race control variables are not statistically different from one in any specification, with the exception of the Hispanic binary variable for the specification controlling for observable characteristics and birth cohort in Column (4). Having a high school degree implies a slightly higher retirement hazard relative to having less than a high school degree, but finishing college has the opposite effect on retirement hazards. Having retiree health insurance provided by an employer significantly increases retirement hazards, consistent with Gruber and Madrian (1995). Fair or poor health status of the husband also increases the likelihood that the husband will retire at a given age, and a larger age difference between the husband and wife is associated with the husband having lower retirement hazards. This is consistent with a preference for joint retirement among couples, as was documented in Johnson (2004). The addition of this variable causes single males to drop out of the regression, leading to a smaller sample size.

The graphs of retirement hazards shown in Figure 3 give strong evidence that the wife working has a proportional effect on the retirement hazards. The wife's career history does not appear to affect retirement hazards differently at different ages, a key assumption in estimating the Cox proportional hazard rate model above. A formal test of proportionality confirms that this assumption is not violated for the variables of interest.

Because the wife's career history may not be complete at the time of the husband's retirement, we may be worried that the variables do not capture the relevant measure of the time the woman spent in the labor force. The years the wife spent in the labor force enters the estimation categorically instead of linearly to partially account for the impreciseness of the variable. Specifications using the fraction of years since age 15 spent in the labor force also yield similar results (not reported).

In addition, couples' labor force participation behavior, particularly near retirement, may be a result of a joint decision and the wife's work behavior may not be considered exogenous for these later years. The data do not allow calculation of the years spent in the labor force before a specific age to test whether variation in early participation in the labor force affected husbands' retirement hazards; the variable available only contains the total self-reported career length until the most recent survey.

The evidence suggests that the length of time a woman spent in the labor force may have increased the retirement hazards of their husbands, but this analysis has several limitations and does not provide a clear mechanism for this effect. In the next section, a similar analysis is done using the accumulated value of the wives' earnings as a possible explanatory variable to determine whether the higher retirement hazards among husbands are associated with higher levels of earnings by his spouse.

4.2 The Effect of Married Women's Earnings on their Husband's Retirement Behavior

Self-reported career lengths do not directly address the mechanism that this paper has in mind of wives with longer careers buying their husbands an earlier retirement. If retirement is a normal good and the income earned by wives was not offset by their husband's reduced earnings or more consumption, their husbands may have retired earlier than otherwise. However, the total income earned by the wives in the sample is not perfectly correlated with their career length. The career length that is self-reported may also include years where the woman worked reduced hours or part-time, and the wage received may also differ for workers of different career lengths.

To overcome these obstacles, the second set of estimates uses more refined measures of womens' work history to examine the question of whether there is an income effect of wives' earnings on male retirement behavior. Here the vector w_i' contains binary variables for "Wife's Earnings≤\$200K," "\$200K<Wife's Earnings<\$500K," and "Wife's Earnings≥\$500K," where the value of earnings includes all earnings before age 50 accumulated to age 50 using a six percent annual interest rate. The omitted category is "Wife had Zero Earnings." Single males and husbands whose wives had not yet attained age 50 are dropped from the analysis. Again, the reported estimates are of hazard ratios and a hazard ratio above one indicates a greater probability of earlier retirement relative to the omitted category. The estimated relative hazards using earnings data are summarized in Table 6.

The first column in Table 6 includes only binary variables for the wife's earnings histories. Column (2) includes control variables for race, education, retiree health insurance availability, health status, and the age difference between the husband and wife that were used in the previous section. Columns (3) and (4) include controls for the birth cohort of the husband.

Columns (5)-(8) repeat the first four specifications controlling for the level of the husbands' earnings. If the wives' earnings are correlated with their husbands' earnings, omitting the value of the husbands' earnings may create spurious regression results, attributing the increased retirement hazards among high-earning men to their high-earning wives instead of to the income effect created by their own earnings. Observations where the husband has not yet reached age 50 are dropped from these specifications.

The results show a clear increase in the husband's retirement hazard associated with a higher accumulated value of his wife's earnings to age 50. The effect on the retirement hazard is monotonically increasing with the level of earnings in almost all of the specifications. The results suggest that a husband's retirement hazard increases between 25 and 35 percent if

Table 6: Cox Proportional Hazard Rate Model - Earnings to Age 50

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wife's Earnings <$200K	1.342	1.354	1.305	1.32	1.269	1.289	1.274	1.282
	[0.113]**	[0.115]**	[0.112]**	[0.114]**	[0.122]*	[0.123]**	[0.123]*	[0.124]*
$200K<Wife's Earnings<$500K	1.536	1.6	1.283	1.349	1.354	1.439	1.286	1.339
	[0.139]**	[0.147]**	[0.119]**	[0.127]**	[0.139]**	[0.149]**	[0.134]*	[0.141]**
Wife's Earnings>$500K	1.952	2.09	1.465	1.628	1.703	1.857	1.532	1.655
	[0.210]**	[0.232]**	[0.162]**	[0.186]**	[0.207]**	[0.230]**	[0.189]**	[0.208]**
African American		0.938		0.882		0.995		0.899
		[0.057]		[0.054]*		[0.069]		[0.063]
Hispanic		1.033		0.906		1.045		0.874
		[0.077]		[0.069]		[0.087]		[0.075]
Other Race		0.943		0.88		0.953		0.845
		[0.131]		[0.123]		[0.148]		[0.132]
HI: Husband has ER HI		1.533		1.275		1.354		1.224
		[0.094]**		[0.084]**		[0.092]**		[0.087]**
Husband education: high school		1.024		0.966		1.049		1.016
		[0.047]		[0.044]		[0.051]		[0.050]
Husband education: college		0.883		0.832		0.892		0.857
		[0.040]**		[0.038]**		[0.043]*		[0.042]**
Husband in fair/poor health		1.134		1.269		1.231		1.307
		[0.042]**		[0.048]**		[0.049]**		[0.053]**
Husband-wife age diference		0.979		0.989		0.984		0.989
		[0.004]**		[0.004]**		[0.004]**		[0.004]**
Husband's Earnings <$200K					1.265	1.296	1.441	1.436
					[0.220]	[0.227]	[0.252]*	[0.253]*
200K<Husband's Earnings<$500K					1.514	1.564	1.39	1.367
					[0.262]*	[0.275]*	[0.243]	[0.243]
Husband's Earnings>$500K					1.926	1.905	1.461	1.43
					[0.340]**	[0.344]**	[0.264]*	[0.266]
Birth Cohort controls			x	x			x	x
Observations	4553	4542	4553	4542	3927	3924	3927	3924

Standard errors in brackets
* significant at 5%; ** significant at 1%

his wife accumulates up to $200,000 in earnings by age 50 relative to a husband whose wife did not participate in the paid labor force. The effect on his retirement hazard is even greater, increasing by 30 to 60 percent, if the accumulated value of his wife's earnings at age 50 is more than $200,000 but less than $500,000. The highest retirement hazards, 50 to 100 percent higher than the baseline hazard of a husband whose wife had zero earnings, are experienced by men whose wives accumulated more than $500,000 in earnings from working before age 50.

The effects of the control variables are similar to the earlier specifications using the wife's career length. Race does not affect the retirement hazards significantly, and having employer-provided retiree health insurance substantially increases retirement hazards leading to earlier retirement among those workers as they do not need to wait for Medicare eligibility to be protected from large medical expenditures. College educated workers retire later relative to workers with lower education levels. Fair or poor health status also increases retirement hazards and a larger age difference between the husband and wife reduces the probability of the husband's retirement as before.

The analysis was repeated using earnings accumulated through ages 55 and 60, omitting observations where the wife and/or husband were under the respective age thresholds and thus reducing the sample size further. The effects were similar for these alternate specifications, but smaller in magnitude, suggesting that earnings between ages 50 and 60 do not predict male retirement hazards in the same way as earnings through age 50. It is possible that the wife's earnings decisions between ages 50 and 60 may be occurring simultaneously with her husband's retirement decisions, thus making it difficult to disentangle the effect of wives' earnings near retirement on their husbands' retirement behavior.

5 Interpretation of Results

5.1 Implications for Labor Force Participation Rates Over Time

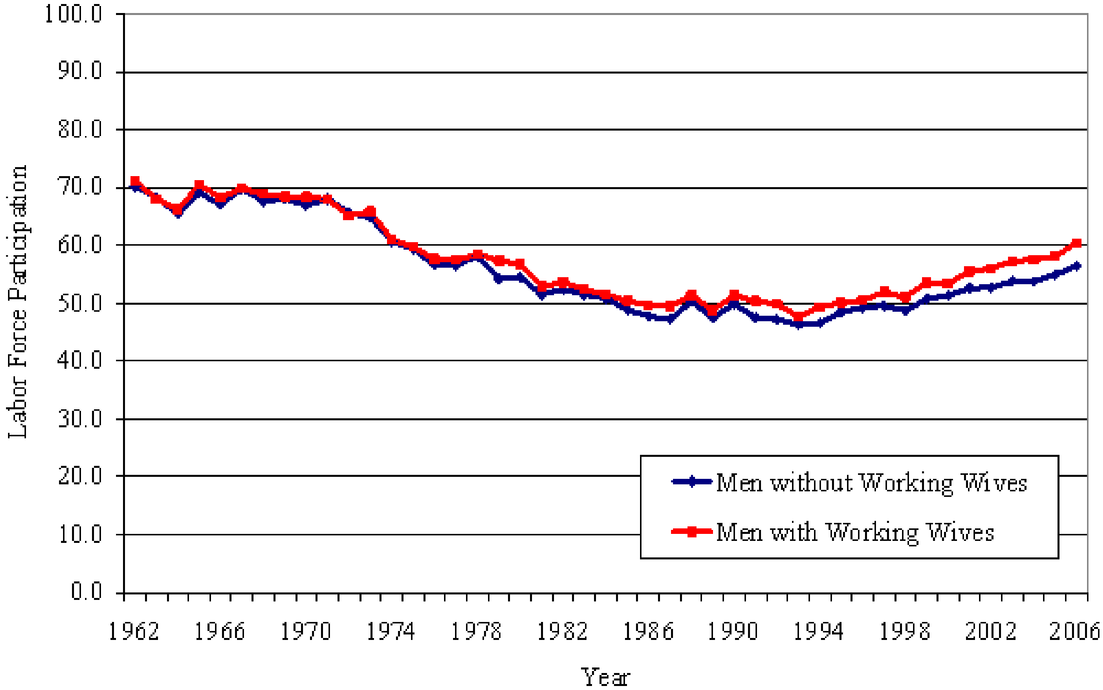
This section shows how the estimates of male retirement hazards by their wives' labor force participation history and their earnings levels can be reconciled with time series data of male labor force participation. As we saw in the introduction, male labor force participation has fallen over time while female labor force participation, particularly among married women, has increased. The results in Section 4 suggest that these two trends are related at the household level, and could be consistent with earnings by the wife creating higher levels of accumulated wealth for retirement, and therefore allowing the husband to purchase more leisure at the end of his career.

The estimates in Table 5 can be summarized as follows: after controlling for observable household characteristics, married men whose wives worked longer appear to have experienced higher retirement hazards relative to those whose wives did not participate in the labor force. However, after controlling for the birth cohort of the husband, there is no statistically significant effect of the number of years his wife worked on his retirement hazard.

These results are better understood by observing a time series of male labor force participation rates over this period, as depicted in Figure 4. Male labor force participation rates are summarized using the CPS for each year between 1962 and 2006 for two groups: married men whose wives have participated in the labor force, and married men whose wives have not worked. The survey asks whether the spouse is currently working and the last time he or she worked for pay. If a married woman was not working at the time of survey and had never worked for pay, she was classified as a non-working wife. The CPS does not contain detailed information regarding the career history of either spouse, so it is not possible to group households by the precise length of time the wife spent in the labor force.

Given that there has been a shift in the relative sizes of these two groups over time, neglecting to include a time trend would attribute the earlier retirement behavior of men in

Figure 4: Total Labor Force Participation Rates of Men Age 55-74, 1962-2006



later cohorts to their wives working when, in fact, the retirement behavior among the two groups are strikingly similar in Figure 4. The labor force participation rates of both groups of married men have trended downwards over time and have rebounded upward in recent years.

In contrast, the estimates in Table 6 suggest that husbands whose wives have accumulated a higher level of earnings during their lifetimes experience higher retirement hazards even after controlling for birth cohort. Unfortunately, the CPS does not contain enough information to show an analog of Figure 4 using earnings rather than previous labor force experience. However, if these data were available, we would expect to see a gap throughout this period between the labor force participation rates for married men whose wives were high earners and the labor force participation rates of husbands of lower-earning women. While the distribution of women across different earnings groups has also changed, the changing composition of households is not what is driving the estimates in the specifications in Table

6 which include controls for birth cohort. The changing composition – about 24 percent of women in the older cohorts surveyed had accumulated zero earnings during her lifetime relative to only 2 percent of women in later cohorts – implies that the observed time series of labor force participation rates are more weighted towards households with higher-earning women in later years relative to earlier years. The statistical significance of the estimates of wives' earnings on male retirement behavior in the presence of birth cohort controls implies that the labor force participation rates of men who are married to high-earning women are at a lower level relative to the labor force participation rates of men married to low-earning women throughout the period.

The two sets of results therefore have slightly different conclusions for the question of whether women entering the labor force helped purchase their husbands an earlier retirement. Men married to high-earning women experience higher retirement hazards and thus lower labor force participation rates than men married to low-earning women. In addition, labor force participation rates of men married to women in each earnings category declined over time, i.e. the overall decline observed in the time series was not solely a result of the transition to a higher percentage of households where the wife accumulated a high level of earnings. The fact that there has been an overall decline in labor force participation rates among men confounds the effect attributable to the career length of their wives. The estimates using the accumulated earnings by married women are able to better isolate the years where the labor supply behavior within the couple is less likely to be a result of a joint decision, which is not possible with the data available on career length. Therefore, the second set of estimates is used in the following section to infer the decline in male labor force participation attributable to the entry of women into the labor force.

5.2 Explaining Earlier Male Retirement Behavior: A Counterfactual Scenario

What do these estimates of hazard ratios imply about the retirement behavior of men during the later part of the 20th century? As shown in the previous section, because the decline in labor force participation rates was present for men whose wives did not enter the labor force, there must have been other factors causing earlier male retirement in addition to the increase in women's earnings. However, we would like to know how much of the earlier retirement experienced by men over this period could be attributed to the higher levels of accumulated earnings earned by married women.

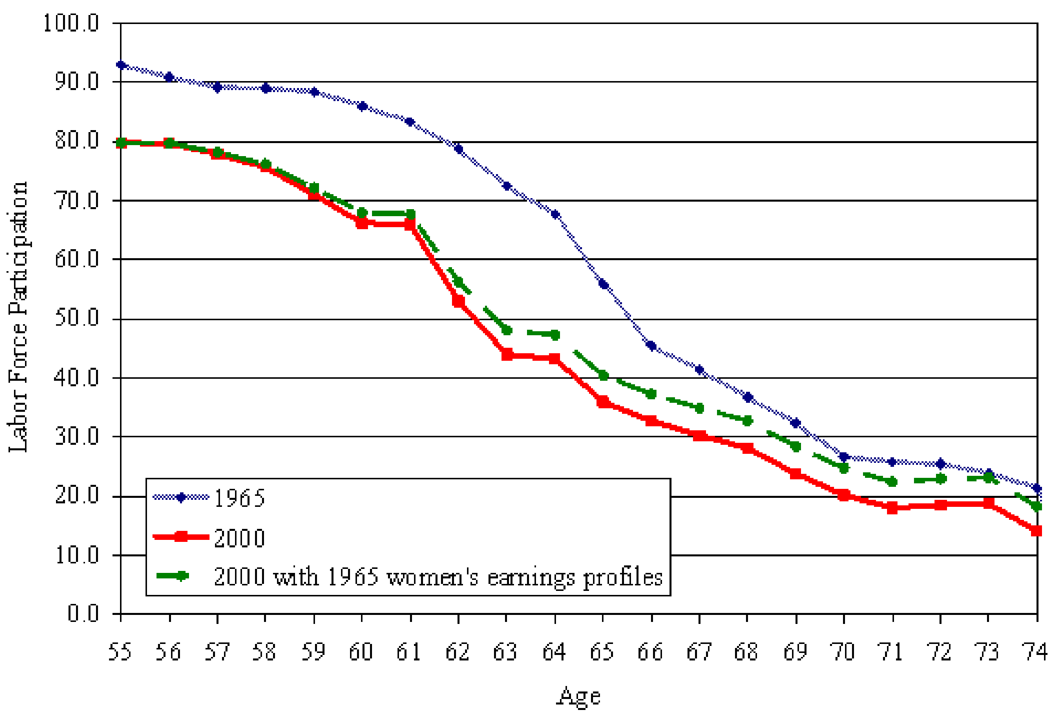
To examine this question, a counterfactual situation is simulated. Suppose men in 2000 were married to women who had the same earnings profiles as married women in 1965. Using the results from the previous section, we can determine how different the labor supply behavior by these men would be compared to what was actually experienced in 2000, and infer how much of the change from 1965 is associated with the higher earnings profiles among women.

First, male labor force participation rates are tabulated for the years 1965 and 2000 for each age between 55 and 74 from the CPS. These labor force participation rates imply a set of retirement hazard rates for each year and, combined with population figures for each age provided by the Social Security Administration, also determine the number of workers and the total labor force participation rate of the 55-74 age group.

Next, the hazard rate model's estimates and the earnings profiles in the HRS data are used to assess the increased proportional hazard rate that is associated with the change in women's earnings profiles between 1965 and 2000. This is done by tabulating the married women in the sample into the four income categories used in the hazard rate model analysis by year, finding how the composition of the married women has changed across the four groups between 1965 and 2000, and applying the model's estimates to determine the overall increased hazard associated with the change in women's earnings during this time. The overall change in the hazard differs slightly depending on which specification is used, but using the average hazard ratio across specifications implies that retirement hazards would be approximately 16 percent lower in 2000 if women's earnings profiles were similar to what they were in 1965 rather than their actual 2000 levels.

The final step is to apply the proportional factor to retirement hazard rates for each age in 2000 and examine the shift associated with the change in earnings by married women. Figure 5 summarizes the results. Labor force participation rates shifted substantially between 2000 and 1965 – the median retirement age decreased from approximately 65.6 to 62.3, a difference of more than three years. Labor force participation for 55- to 64-year-old age group overall reduced from 84.8 percent to 67.3 percent; for the 65- to 74-year-old age group, the percentage of male workers in the labor force fell from 65.5 percent to 49.8 percent.

Figure 5: Labor Force Participation Rates of Men Age 55-74, 1965 and 2000



Under the counterfactual scenario where men in 2000 are married to women with earnings profiles similar to women in 1965 (as indicated by the middle dashed line in

Figure 5), more men would have been in the labor force relative to the number who actually participated in the labor force in 2000. The estimates imply that the median retirement age for the counterfactual scenario would have been 62.8 instead of 62.3. The labor force participation rate for 55- to 74-year-olds would have been 52.5 percent rather than 49.8 percent, representing approximately 563,000 additional workers. The results therefore suggest that approximately 17 percent of the reduction in male labor force participation rates between 1965 and 2000 could be associated with the increased earnings accumulated by women over this time period.

6 Conclusion

The earlier retirement ages chosen by men in the latter half of the 20th century combined with the more favorable mortality experienced during this time has dramatically increased the length of time spent in retirement to a larger fraction of workers' lifetimes. Also during this period, women - in particular, married women - entered the labor force in large numbers and the total labor force grew despite the earlier exits of men. This paper examines whether the expanded labor market opportunities for women allowed married men to retire earlier using cross-sectional variation in both their wives' self-reported career lengths and their accumulated value of earnings.

The first part of the analysis examines the relationship between a woman's length of labor market experience and her husband's retirement decision in a hazard rate model. The results show a weak relationship between the wife's self-reported career length and higher retirement hazards, or earlier retirement. The effect is present with and without controls for race, education, health insurance availability, health status, and the age difference within the couple. However, the addition of controls for the birth cohort of the husband eliminate the statistical significance of the results. The overall decline of male labor force participation confounds the results, indicating that an increase in the relative number of households with wives who participated in the labor force is driving the estimates.

In the second set of estimates, the hazard model approach is used to estimate the effect of the accumulated value of a woman's earnings before age 50 on her husband's retirement age. Earnings are accumulated to age 50 because it is thought that earnings farther from retirement are more exogenous to the retirement behavior within the household than earnings from age 50 forward. These specifications show a substantial effect of wives' earnings on their husband's retirement age: the hazard rate for retirement is approximately 30 percent higher for a married man whose wife accumulated earnings up to $200,000 than one whose wife had no accumulated earnings by age 50. The relative hazard is even larger for higher levels of accumulated earnings. These results cannot be explained solely by a change over time in the distribution of households across different levels of women's accumulated earnings. The net result of these estimates is that approximately 17 percent of the decrease in male labor force participation between 1965 and 2000 could be associated with the higher earnings levels accumulated by women over this time period.

This paper suggests that at least some portion of the income earned by women was saved and used to provide extra retirement income for the household, allowing their husbands to retire earlier than otherwise. This analysis also gives suggestive evidence that time spent in retirement (or leisure at the end of life) is a normal good and that part of the earlier retirement displayed by men could be due to higher household incomes throughout this period. Future research may aim to quantify the marginal propensity to consume goods with extra income, and whether this depends on the source of earnings. Earnings from a secondary worker participating in the labor force likely also increased some expenses (e.g. child care, fixed costs of working), and may have also been used for extra consumption goods. Because prime-aged men's labor supply elasticities have been estimated to be small, it is unlikely that the husband bought leisure earlier in life as a result of his wife's earnings. However, on the intensive margin, earnings by the wife may have reduced other household income.

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