Women at the Helm: Marital Sorting, Social Security, and Retirement Behaviors of Married Women

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Abstract

This paper studies how the retirement behavior of married couples in the United States varies by each spouse's relative earnings contribution and identifies key drivers in understanding the patterns. Using the Health and Retirement Study linked to Social Security administrative records, we document several findings. First, households leave a sizable amount of potential Social Security wealth unrealized relative to the joint optimal claiming strategy, and these losses are larger in female-breadwinner households. Second, and more puzzling, wives consistently lose more Social Security wealth than husbands, even when they are the primary earners. Furthermore, breadwinner wives are also more likely to be married to less healthy husbands, a sorting pattern that may exacerbate these asymmetries. Motivated by these facts, we develop and estimate a dynamic structural model of couples that incorporates health, leisure complementarities, and detailed Social Security rules, and use it to analyze the mechanisms driving these deviations and their implications for Social Security reform.

JEL codes: J12, J16, J26

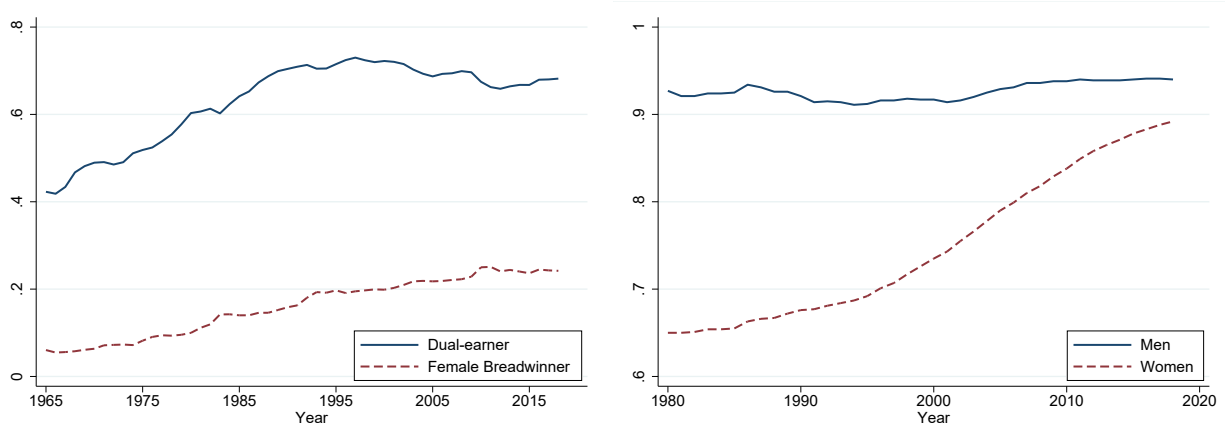
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1 Introduction

Over the past sixty years, the dramatic increase in female educational attainment and labor force participation has significantly changed the economic position of women within households. A majority of married couples are now dual earners, and an increasing share of wives earn more than their husbands (Figure 1a). These shifts have greatly expanded the proportion of women eligible for Social Security (SS) benefits on the basis of their own work histories (Figure 1b), changing the way families interact with Social Security benefit rules and raising new questions about how couples coordinate retirement and claiming decisions.

Understanding how households make retirement decisions in this new landscape is essential for evaluating both retirement behavior and the fairness of Social Security design. For most Americans, Social Security is the primary source of income in retirement. The timing of retirement and benefit claiming has permanent consequences: claiming early reduces benefits for life, while delaying claiming raises them. Although the program was originally designed to be actuarially fair, shifts in longevity, interest rates, and policy parameters—such as the increase in delayed retirement credits—have altered those incentives (Slavov, 2023). Moreover, Social Security includes spousal and survivor benefits where each spouse's retirement



(a) Share of Dual-Earner and Female Breadwinner Couples

(b) Fully Insured for Social Security Retirement Benefits

Figure 1: Trends in Family Types and Social Security Coverage Among Women

Notes: Figure 1(a) is based on a sample of couples where both spouses were aged 25–61 in the March Current Population Survey (CPS) from 1965–2018. "Female breadwinners" indicate wives whose earnings are greater than their husbands. Figure 1(b) reports the share of men and women aged 62–66 who were entitled to Social Security retirement benefits based on their own earnings history (1980–2018). Data sources: Office of the Chief Actuary and Office of Research, Evaluation, and Statistics, Social Security Administration.

decision can directly affect the other's benefits, making coordination within households central to maximizing household Social Security wealth. Despite its importance, there remains little systematic evidence on how couples actually navigate these decisions.

This paper addresses that gap by examining the retirement behaviors of married women and their spouses, with particular attention to how those behaviors differ by the wife's relative earnings contribution. Households where the wife is the primary earner may face different dynamics from those where the husband is the breadwinner. Prior research has shown that relative earnings often shape bargaining power within households (Bertocchi et al., 2014; Friedberg and Webb, 2006; Elder and Rudolph, 2003), and gender differences in preferences and caregiving responsibilities may further influence how households make important decisions depending on the gender of the primary earner (see Croson and Gneezy (2009) for a comprehensive review on gender differences in risk, social, and competitive preferences).

Using the Health and Retirement Study (HRS) linked to Social Security administrative records, we begin by documenting novel empirical patterns of Social Security claiming behavior among couples and highlighting the drivers underlying these choices. First, we calculate the optimal Social Security claiming ages that maximize the expected present value of household Social Security wealth and compare those to the actual claiming ages of couples. We find that realized household Social Security wealth is 4–6% lower relative to that under the joint optimal claiming strategy, and these losses are larger in female-breadwinner households. When comparing each spouse's actual Social Security wealth to its optimal level, wives consistently lose more Social Security wealth than husbands, even when they are the primary earners. In male-breadwinner households, husbands modestly exceed their optimal present value while wives forgo roughly 12 percent. In female-breadwinner households, wives' losses still exceed those of husbands, with shortfalls ranging from 5 to 7 percent. Wives still retire earlier than optimal, undermining their own benefits and survivor benefits when their husbands become widowers. The asymmetry raises a puzzle: why do wives bear disproportionate losses, even when they are the primary earner? These patterns suggest a lack of household coordination to maximize joint wealth, with decisions apparently tilted toward husbands' incentives rather than joint optimization.

Second, we find that spousal health is correlated with breadwinner status, as female breadwinners are more likely to be healthy but also have a higher likelihood of being married to a disabled, less healthy husband. This aligns with our finding that husbands of female breadwinners are 72% more likely to receive Social Security Disability Insurance (SSDI).

Furthermore, female breadwinners may decide to retire and claim Social Security benefits earlier than their optimal claiming ages to provide care for their disabled husbands, as women are often the primary caregivers of family members.

Motivated by these patterns, we construct a structural model to identify the key factors shaping retirement outcomes across different marriage types. This dynamic structural model of married couples incorporates leisure complementarities (i.e., spouses enjoy utility from being retired at the same time), health sorting, and institutional details of Social Security benefits, including disability, retirement, spousal, and survivor benefits. The model is estimated by simulated method of moments and then used to investigate how married women from different marriage types respond to policy counterfactuals related to Social Security benefits.

We then conduct counterfactual analyses to evaluate the distributional and welfare consequences of alternative Social Security policy designs. While the share of dual-earner and female-breadwinner families has risen sharply, the current Social Security benefit design is still largely based on the traditional one-earner model. Under current rules, conditional on the same total household earnings, one-earner couples receive higher Social Security benefits than dual-earner couples due to the current design of spousal benefits. This design feature has sparked debate about whether Social Security should be reformed to achieve "marriage neutrality." Our model allows us to perform novel counterfactual policy reforms that have been proposed to make the system more marriage-neutral while preserving its financial sustainability, such as earnings sharing (i.e., combining a couple's earnings and splitting them equally when computing Social Security benefits) and adjusting spousal and survivor's benefits.

Our paper contributes to the large literature studying Social Security claiming and retirement behaviors using dynamic structural models (Rust and Phelan, 1997; French, 2005; Scholz et al., 2006; De Nardi et al., 2010; French and Jones, 2011; Pashchenko and Porapakkarm, 2024; İmrohoroğlu and Kitao, 2012; Bairoliya and McKiernan, 2023). Specifically, our paper is closely related to the growing structural literature that explicitly examines the behavior of married couples (Gustman and Steinmeier, 2000, 2004; van der Klaauw and Wolpin, 2008; Blau and Gilleskie, 2006; Casanova, 2010; De Nardi et al., 2025; Borella et al., 2023). These include studies that focus on understanding the drivers behind the empirical pattern that spouses often retire together, even when there is a large age gap between the two spouses. Other works have highlighted the role of Social Security marital benefits on couples' late-life work and savings incentives. We extend this literature by providing new

empirical evidence on couples' Social Security claiming decisions by the spouse's relative earnings and evaluate the welfare implications of Social Security reforms that, to the best of our knowledge, have not been explored in the literature before.

The rest of the paper is organized as follows. Section 2 provides descriptive patterns regarding married men and women's retirement behaviors by female breadwinner status. Section 3 describes a fully specified dynamic programming model. Section 4 discusses the estimation method of the model parameters and reports the estimates of the model parameters. Section 5 presents the key findings from the counterfactual policy reform exercises using the estimated model. Section 6 concludes.

2 Empirical Patterns

2.1 Data and Sample Summary

We use the Health and Retirement Study (HRS), a rich panel study of Americans above age 50 and their spouses. Initiated in 1992 and conducted biennially, the HRS collects extensive information on a wide range of topics including demographics, employment, wealth, income, health, and program participation. Our analysis includes data from 1992 to 2018. Importantly, we link the HRS to administrative Social Security data containing detailed information on Social Security claiming behavior as well as their annual Social Security earnings from 1951 to 2020.

We focus on a sample of women who were 1) married and aged 51–61 when they first entered the HRS and 2) with a record of receiving Social Security benefits at any point in time. Additionally, we focus on women whose age differences with their husbands are ten years or less (i.e., the wife-husband age difference ranges from -10 to 10) as women with extremely large age gaps with their husbands may have considerably different incentives in coordinating retirement with their husbands. In total, our sample consists of 3,722 women.

Based on annual Social Security earnings data, we categorize a female respondent as a "breadwinner" if her average lifetime earnings at age 62 is greater than that of her husband.[1] If this information is missing, we instead use prospective Social Security wealth measures available in the public HRS data and classify a female as a "breadwinner" if her prospective Social Security wealth at age 62 is greater than that of her husband.

[1] We use age 62 as the cutoff for measuring average lifetime earnings as it is the earliest age that individuals can claim Social Security retirement benefits.

Table 1 provides summary statistics of our sample of women and their husbands. First, non-breadwinner women are on average 1.2 years younger than their husbands whereas breadwinner women are approximately the same age as their husbands. Second, breadwinner women are not only more educated than their non-breadwinner counterparts but also more likely to have higher educational attainment than their husbands (i.e., "married down"). This aligns with breadwinner women having higher average lifetime earnings and lifetime labor supply as measured by the total Social Security quarters of coverage (QCs; quarters of employment credited towards being insured under Social Security). Third, breadwinner women are less likely to be white, and in particular, Black women comprise 12.4% of breadwinners, which is more than double the 5.6% observed among non-breadwinners.

Correlation Between Spousal Health and Breadwinner Status

Table 1 presents three different measures of couple health by female breadwinner status: self-reported health, disability status, and whether the respondent ever had emotional, nervous, or psychiatric problems. Self-reported health is based on the respondent's self-assessed general health, categorized as 'poor (1),' 'fair (2),' 'good (3),' 'very good (4),' and 'excellent (5).' Disability status is determined by the question, "Do you have any impairment or health problem that limits the kind or amount of paid work you can do?" Respondents answering "yes" are classified as disabled.

The summary statistics in Table 1 reveal that, on average, female breadwinners tend to be healthier than non-breadwinner women. However, they are also more likely to be married to husbands with poorer health outcomes. To further investigate this sorting pattern, we perform a logit regression of the husband's health on the wife's health, the wife's breadwinner status, and the interaction of the wife's health and breadwinner status. The model controls for both spouses' age and age squared, educational attainment, and race. The results are reported in Table 3.

Table 3 indicates evidence of marital sorting on health: unhealthy wives are more likely to have unhealthy husbands. However, conditional on the wife's health, female breadwinners are significantly more likely to be matched with unhealthy husbands. In particular, columns (1) and (2) show that the likelihood of a female breadwinner having an unhealthy husband is similar to that of an unhealthy wife having an unhealthy husband. Given that disability or bad health is correlated with earlier labor force exits and earlier Social Security claiming, the correlation between female breadwinner status and spousal health may act as one potential mechanism behind differences in couple's Social Security claiming behavior by female

Table 1: Sample Summary Statistics of Women by Their Breadwinner Status

	Non-breadwinner	Breadwinner
Panel A: Own Summary Statistics		
Age at HRS entry	54.30	53.96
Wife-husband age difference	-1.23	-0.13
Education (%)		
Less than high school	15.20	7.65
High school graduates	40.56	32.59
Some college	24.00	28.02
College graduates	12.93	21.39
Post-college	7.32	10.35
Education relative to husband (%)		
Married down	23.98	35.48
Married same	43.34	40.82
Married up	32.68	23.70
Race (%)		
White	89.47	80.27
Black	5.57	12.38
Other	4.96	7.35
Average lifetime earnings (age 19–62, in $)	14,339	33,415
Total Social Security quarters of coverage[‡]	87.3	133.7
Self-reported health at HRS entry[*]	3.51	3.54
Disabled at HRS entry (%)	21.4	15.0
Ever had emotional, nervous, or psychiatric problems (%)	11.4	7.61
Panel B: Husbands' Summary Statistics		
Average lifetime earnings (age 19–62, in $)	45,671	20,699
Total Social Security quarters of coverage	146.5	98.42
Self-reported health at HRS entry	3.52	3.25
Disabled at HRS entry (%)	16.67	28.5
Ever had emotional, nervous, or psychiatric problems (%)	5.88	9.68
Person observations	3,007	715
(%)	(80.8%)	(19.2%)

Notes: All dollar values are in 2019 dollars.

[†] A quarter of coverage (QC) refers to a quarter of Social Security-covered employment. Generally, 40 QCs are required to be insured for Social Security retirement benefits.

[*] Self-reported health is categorized as poor (1), fair (2), good (3), very good (4), and excellent (5).

Table 2: Summary Statistics by Female Breadwinner Status, Cohort Facing FRA of 66

	Non-breadwinner	Breadwinner
Panel A: Wives' Summary Statistics		
Employment & Earnings		
Work for pay	0.600	0.785
Median earnings ($)	7,673	40,580
Health		
Bad health	0.194	0.123
Disabled	0.235	0.119
Psych. problems	0.218	0.134
Cancer	0.093	0.087
Arthritis	0.482	0.399
Diabetes	0.134	0.127
Lung disease	0.064	0.040
Heart disease	0.114	0.105
Stroke	0.028	0.014
High blood pressure	0.386	0.391
Obese	0.349	0.349
Mortality		
Wife dead (%)	0.090	0.060
Wife's Age at spouse's death (yrs)	62.9	61.4
Household Finance Decision-making		
Median household wealth ($)	314,065	327,696
Wife is financial resp.	0.346	0.513
Husband is financial resp.	0.660	0.500
Final say = Wife (%)	11.9	22.8
Final say = About equal (%)	53.7	54.6
Final say = Husband (%)	34.5	22.6
Panel B: Husbands' Summary Statistics		
Employment & Earnings		
Work for pay	0.761	0.666
Median earnings ($)	44,462	19,416
Health		
Bad health	0.167	0.192
Disabled	0.164	0.243
Psych. problems	0.113	0.125
Cancer	0.069	0.056
Arthritis	0.369	0.401
Diabetes	0.173	0.179
Lung disease	0.043	0.059
Heart disease	0.142	0.154
Stroke	0.031	0.041
High blood pressure	0.444	0.465
Mortality		
Husband dead (%)	0.124	0.159
Husband's age at death (yrs)	64.9	63.1

Table 3: Logit Estimates of Husbands' Health on
Wives' Health and Breadwinner Status (Marginal Effects)

	Health Measure		
	Disabled	"Bad" health†	Has nervous, emotional, or psychiatric problems
	(1)	(2)	(3)
Wife's health	0.090***	0.103***	0.090***
	(0.013)	(0.013)	(0.016)
Wife is breadwinner	0.105***	0.092***	0.042**
	(0.021)	(0.018)	(0.021)
Wife's health × breadwinner	0.019	-0.015	0.027
	(0.032)	(0.023)	(0.031)
Person-year observations	27,491	28,582	28,112

Notes: This table reports logit regression results using our sample from the HRS (1992-2018). The dependent variable is the husband's health for each of the three health measures. 'Wife's health' refers to the wife's health status for each column's corresponding health measure (i.e., 'wife is disabled' for column (1), 'wife has bad health' for column (2), and 'wife has nervous, emotional, or psychiatric problems' for column (3)). All specifications control for the age, age-squared, race dummies, and education dummies of both spouses. Standard errors are in parentheses, clustered at the household level. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.
† We define "bad" health as reporting either 'poor' or 'fair' self-reported health.

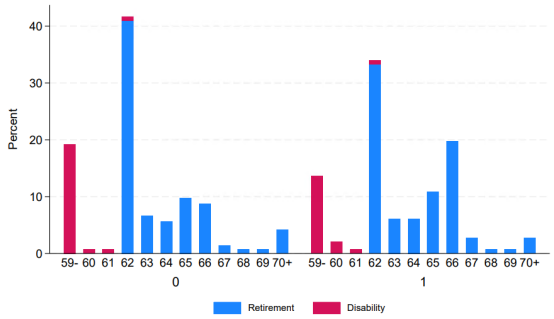
breadwinner status.

2.2 Social Security Benefit Types

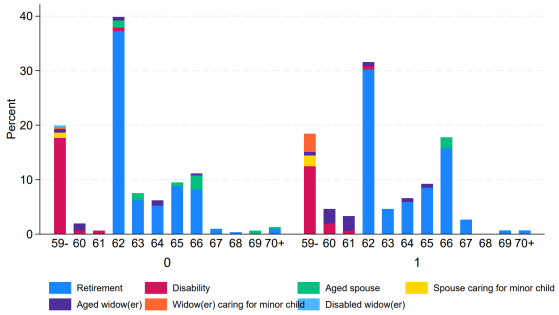
Figure 2 presents the distribution of claiming ages of married women and men in our sample by female breadwinner status.

2.3 Social Security claiming

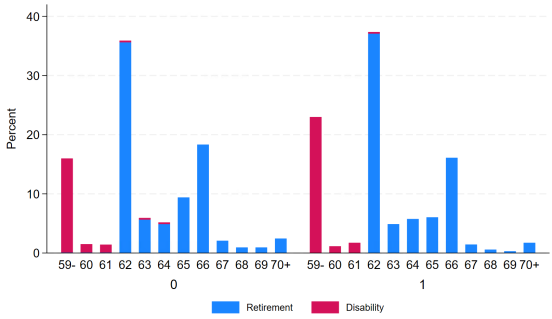
To examine the relationship between the wife's breadwinner status and the couple's Social Security claiming behavior and late-life labor supply, we regress our outcomes of interest on an indicator for whether the wife is the breadwinner along with other covariates. Our outcomes of interest include 1) the types of Social Security benefits ever claimed, 2) whether the couple claimed Social Security jointly, 3) whether they claimed Social Security at or



(a) Women (Primary Benefits)



(b) Women (All Benefits)



(c) Men (Primary Benefits)



(d) Men (All Benefits)

Figure 2: Distribution of Claiming Ages and the Type of Benefit Claimed by Female Breadwinner Status

after age 65, and 4) the couple's total QCs between age 62 to 70. Our regression covariates include dummy variables for the race and education of both spouses and dummy variables for the age gap between the two spouses. We use seven categories for the wife-husband age gap (-5 or greater, -4 or -3, -2, -1, 0, 1 or 2, and 3 or greater) such that the share of each category in our sample is roughly equal.

When examining the types of Social Security benefits ever claimed, we use detailed information in the administrative Social Security files and consider the following types of benefits: primary, auxiliary, retirement, disability, spousal, and dual entitlement. First, primary benefits are those based on the respondent's own earnings record such as retirement and Social Security Disability Insurance (SSDI) benefits. In contrast, auxiliary benefits (e.g., spousal and survivors benefits) are based on the spouse's earnings record.[2] Lastly, dual entitlement refers to the simultaneous receipt of primary and auxiliary benefits. This occurs when auxiliary benefits are greater than primary benefits since beneficiaries only receive auxiliary benefits *in excess* of primary benefits.[3] Therefore, dual entitlement implies that an individual has sufficient earnings history to qualify for primary benefits but their spouses' lifetime earnings are significantly higher than theirs.

Table 4 reports the relationship between the wife's breadwinner status and the couple's type of Social Security benefit they have ever received. Panel A indicates that breadwinner wives are more likely to receive benefits based on their own earnings records (columns (1) and (2)) and substantially less likely to receive benefits based on their husbands' earnings records (columns (4) to (6)) compared to their non-breadwinner counterparts. Interestingly, although Table 1 indicates that breadwinner wives are on average healthier than non-breadwinner wives, column (3) indicates that there is weak evidence that breadwinner wives are less likely to ever receive SSDI benefits. One possibility is that disabled non-breadwinner wives are less likely to meet SSDI's recency-of-work requirement (i.e., individuals need to have worked at least 5 years of the past 10 years before disability onset) and therefore, may not be able to apply for benefits despite having worse health conditions.

[2]In general, spousal benefits equal 50% of the spouse's primary insurance amount (PIA) and survivors benefits for widows and widowers are 100% of the deceased spouse's PIA.

[3]For instance, a widow may be entitled to $500 per month as retirement benefits and $1,000 per month as survivor benefits. Then her total Social Security benefit would be $1,000 with $500 in primary benefits and $500 in auxiliary benefits and would be considered dually entitled.

Table 4: OLS Estimates of Social Security Receipt on Wives' Breadwinner Status

	Ever primary benefits (1)	Ever retirement benefits (2)	Ever retirement benefits (3)	Ever SSDI (4)	Ever SSDI (5)	Ever spousal benefits (6)	Ever dual entitlement (7)	Auxiliary benefits only (8)
Panel A: Wife								
Wife is breadwinner	0.070***	0.078***	0.072***	-0.026	0.009	-0.173***	-0.304***	-0.083***
	(0.017)	(0.022)	(0.022)	(0.023)	(0.019)	(0.020)	(0.019)	(0.010)
Wife is disabled type			-0.097***		0.442***			
			(0.024)		(0.025)			
Mean when wife is non-breadwinner	0.863	0.799	0.799	0.168	0.168	0.263	0.422	0.117
Observations	2,559	2,559	2,559	2,559	2,559	2,559	2,559	2,559
Panel B: Husband								
Wife is breadwinner	-0.042*	-0.097***	-0.086***	0.117***	0.066***	0.043***	0.092***	0.002
	(0.023)	(0.029)	(0.030)	(0.029)	(0.023)	(0.016)	(0.018)	(0.006)
Husband is disabled type			-0.104***		0.522***			
			(0.023)		(0.026)			
Mean when wife is non-breadwinner	0.971	0.918	0.918	0.162	0.162	0.014	0.008	0.005
Observations	2,547	2,547	2,547	2,547	2,547	2,547	2,547	2,547

Notes: This table reports OSL regression results using our sample from the HRS (1992-2018). All specifications include dummy variables for the race and education of both spouses and the age gap between the two spouses. Standard errors are in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Column (1) of Panel B indicates a relatively small difference in the likelihood of ever receiving primary benefits between husbands of breadwinner and non-breadwinner wives. However, this can be explained by the fact that husbands of breadwinner wives are 9.7 percentage points (10.5%) less likely to claim retirement benefits and instead, 11.7 percentage points (72%) more likely to claim SSDI benefits than husbands of non-breadwinner wives (columns (2) and (3)). Moreover, columns (4) and (5) exhibit stark differences in the likelihood of husbands receiving benefits based on their wives' earnings as husbands of breadwinner wives are four times more likely to ever receive spousal benefits and more than ten times more likely to ever receive dual entitlements.

Next, Tables 5 and 6 report differences in joint Social Security claiming and late-life labor supply by breadwinner status. First, Table 5 reports that breadwinner wives are less likely to claim Social Security benefits in the same year as their husbands with the average gap in claiming years being 1.53 years larger than that among couples with non-breadwinner wives. Second, Table 6 columns (1) to (4) indicate that breadwinner wives are more likely to claim Social Security at or after the FRA and on average work 3.8 quarters more between ages 62 to 70. In contrast, husbands of breadwinner wives are less likely to claim at or after FRA and have lower late-life labor supply between ages 62 and 70 (columns (5) and (6)). This pattern aligns with the finding from Table 4, where husbands of breadwinner women are more likely to claim SSDI, as SSDI benefits are only available before full retirement age.

Table 5: OLS Estimates of Joint Social Security Claiming on Wives' Breadwinner Status

	Claim in the same year	Claim in the same year	|Gap between claiming years|	|Gap between claiming years|
	(1)	(2)	(3)	(4)
Wife is breadwinner	-0.038**	-0.026	1.669**	1.364*
	(0.019)	(0.019)	(0.707)	(0.697)
Wife is disabled type		0.020		0.980*
		(0.018)		(0.511)
Husband is disabled type		-0.075***		2.687***
		(0.018)		(0.576)
Mean when wife is non-breadwinner	0.172	0.172	5.35	5.35
Observations	3,141	3,141	3,141	3,141

Notes: This table reports OSL regression results using our sample from the HRS (1992-2018). All specifications include dummy variables for the race and education of both spouses and the age gap between the two spouses. Standard errors are in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 6: OLS Estimates of Late-life Employment on Wives' Breadwinner Status

	Wife claims at age 65+ (1)	Wife claims at FRA+ (2)	Wife's QCs (age 62-70) (3)	Wife's QCs (age 62-70) (4)	Husband claims at age 65+ (5)	Husband claims at FRA+ (6)	Husband's QCs (age 62-70) (7)	Husband's QCs (age 62-70) (8)
Wife is breadwinner	0.075***	0.047***	3.739***	3.277***	-0.072***	-0.034**	-2.279***	-1.579**
	(0.023)	(0.016)	(0.694)	(0.669)	(0.022)	(0.016)	(0.708)	(0.697)
Wife is disabled type				-4.688***				
				(0.371)				
Husband is disabled type								-5.923***
								(0.482)
Mean when wife is non-breadwinner	0.172	0.141	5.35	5.35	0.258	0.207	8.876	8.876
Observations	3,711	3,711	3,077	3,077	3,765	3,765	3,113	3,113

Notes: This table reports OSL regression results using our sample from the HRS (1992-2018). All specifications include dummy variables for the race and education of both spouses and the age gap between the two spouses. Standard errors are in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Tables 4 to 6 show that breadwinner wives are more likely to delay benefits claiming, and rely less on spousal benefits, reflecting their stronger labor market engagement and higher lifetime earnings. Furthermore, they are less likely to claim benefits jointly with their husbands. In contrast, their husbands show increased reliance on spousal and disability benefits and tend to retire earlier. These findings highlight shifting gender roles in retirement strategies and the intra-household dynamics where traditional breadwinning roles are reversed, as more women attain higher education and marry down.

3 Optimal Benefit Claiming

Household Social Security Wealth We measure household Social Security wealth as the expected present value of retirement benefits that a couple can expect to receive over their joint lifetimes. This calculation accounts for three types of benefit provisions in the Social Security system: retirement benefits based on one's own earnings, spousal benefits tied to the earnings of the spouse, and survivor benefits that protect the surviving spouse upon the death of the other. Each provision has its own schedule of reductions and credits, which is displayed in Table 7 with the Full Retirement Age (FRA) to be age 66 in our baseline.

Let $c_m, c_f \in \{62, \ldots, 70\}$ denote the claiming ages of the husband and wife. Household wealth is defined as

$$HH(c_m, c_f) = PV^{\text{both}}(c_m, c_f) \; + \; PV^{\text{widow}}(c_m, c_f) \; + \; PV^{\text{widower}}(c_m, c_f). \tag{1}$$

Table 7: Adjustments to retirement, spousal, and survivor benefits by claiming age.

Claiming Age	Retirement Benefit (% of own PIA)	Spousal Benefit (% of other's PIA)	Survivor Benefit (% of deceased's PIA)
62	75	35	∼71 (max 28.5% reduction)
63	80	37.5	∼76
64	86.7	41.7	∼81
65	93.3	45.8	∼86
66	100	50	100
67	108	50	100 + delayed credits
68	116	50	100 + larger delayed credits
69	124	50	100 + larger delayed credits
70	132	50	100 + maximum delayed credits

For each possible combination of claiming ages for the husband and wife, we trace out the flow of benefits that would be received in each state of the household: (i) both spouses alive, (ii) widowhood (wife survives husband), and (iii) widowerhood (husband survives wife). These flows are then weighted by the probability that each state occurs and discounted to the present. The household's Social Security wealth for that claiming-age pair is the sum of these state-contingent present values. Finally, the household's optimal strategy is defined as the claiming-age combination that maximizes expected wealth.

Retirement Benefits Each spouse, $s \in \{m, f\}$, is entitled to a retirement benefit based on their own PIA. Claiming before the FRA results in an actuarial reduction, while delaying after FRA yields an increase through delayed retirement credits. The monthly own benefit at claiming age c_s is

$$B_s^{own}(c_s) = PIA_s \cdot \alpha(c_s), \tag{2}$$

where $\alpha(c_s) < 1$ for $c_s < FRA$ and $\alpha(c_s) > 1$ for $c_s > FRA$.

Spousal Benefits Upon filing, a spouse may alternatively claim a spousal benefit based on the other spouse's PIA. This spousal benefit is up to half of the other spouse's PIA if claimed at or after FRA, but is reduced if claimed earlier. Spousal benefits are not increased by delaying past FRA. A spousal benefit is only payable once the other spouse has filed for their own retirement benefit. While both spouses are alive, each compares their own benefit to the spousal benefit and receives whichever is larger.

The spousal benefit at age c_s is

$$B_s^{spousal}(c_s) = PIA_{-s} \cdot \gamma(c_s). \tag{3}$$

While both are alive, each spouse receives

$$B_s^{both}(c_m, c_f) = \max\{B_s^{own}(c_s), B_s^{spousal}(c_s)\}. \tag{4}$$

Survivor Benefits If one spouse dies, the surviving spouse may claim a survivor benefit. This benefit equals the deceased spouse's benefit including any delayed retirement credits, but with limits if the deceased had filed early. Survivor benefits themselves are reduced if the survivor claims before FRA. Upon widowhood or widowerhood, the survivor always receives whichever is larger: their own retirement benefit or the survivor benefit. For example, if the

husband dies at age d_m, the widow's survivor benefit is

$$B_f^{surv}(d_m, c_f) = \min\left\{\delta(c_f) \cdot \text{Base}(d_m, c_m),\ \text{Cap}(c_m)\right\}, \tag{5}$$

where $\delta(c_f)$ reflects the survivor's claiming-age adjustment, $\text{Base}(d_m, c_m)$ is the deceased husband's benefit at death, and $\text{Cap}(c_m)$ enforces the widow(er) limit. The survivor ultimately chooses the larger of own and survivor benefits:

$$B_f^{widow}(d_m, c_f) = \max\{B_f^{own}(c_f), B_f^{surv}(d_m, c_f)\}. \tag{6}$$

The widower case is symmetric.

Household Maximization Each benefit stream is weighted by the probability that the corresponding state occurs. While both are alive, benefits are weighted by the joint probability of survival. Widowhood and widowerhood probabilities are determined by the hazard that one spouse dies at a given age multiplied by the probability that the other survives. Let $S_m(a)$ and $S_f(a)$ denote survival probabilities at age a for the husband and wife, respectively. The probability that both are alive at age a is $S_m(a)S_f(a)$. The probability that the husband dies at d_m while the wife survives to age $a \geq d_m$ is $\big(S_m(d_m - 1) - S_m(d_m)\big)S_f(a)$. Analogously for widowerhood. All expected benefits are discounted to age 62 at a rate r.

$$PV = \sum_{a=62}^{A_{\max}} \frac{\mathbb{E}[\text{Benefit}(a)]}{(1+r)^{a-62}}. \tag{7}$$

We compute $HH(c_m, c_f)$ for all combinations of claiming ages between 62 and 70 for the husband and the wife $(c_m, c_f) \in \{62, \ldots, 70\}^2$. The optimal claiming strategy is defined as the pair of claiming ages that yields the highest expected present value of lifetime Social Security wealth, such that

$$(c_m^\star, c_f^\star) = \arg \max_{(c_m, c_f) \in \{62,\ldots,70\}^2} HH_PV(c_m, c_f). \tag{8}$$

3.1 Optimal versus Actual Social Security Wealth

We first compare actual and optimal Social Security wealth at the household level. Table 8 and Figure 3 (a) show that both male and female breadwinner households fall short of their optimal benchmarks by 4.5 and 5.7 percent, respectively. These gaps reflect systematic early

Table 8: Household Social Security Wealth by Breadwinner Type

	Male BW Couple	Female BW Couple
HH Present Value of Social Security Wealth (in $1,000)		
Optimal	495.540	485.640
Actual	473.320	457.030
Relative to optimal	-4.5%	-5.7%
(Actual - Optimal) claiming age		
Wife	-0.275	-3.274
Husband	-4.461	-0.380

Table 9: Household Social Security Wealth by Alternative Breadwinner Classification

	Male BW Couple	Egalitarian Couple	Female BW Couple
HH Present Value of Social Security Wealth (in $1,000)			
Optimal	483.480	521.130	403.260
Actual	463.180	492.140	381.950
Relative to optimal	-4.2%	-5.5%	-5.3%
(Actual - Optimal) claiming age			
Wife	-0.971	-0.491	-4.110
Husband	-4.225	-3.157	0.898

claiming: the primary earner retires 4.5 years too early in male breadwinner households and 3.3 years too early in female breadwinner households.

We also present results under an alternative definition of marital types, where we use the ratio of the wife's PIA to the sum of both spouses' PIAs. If this ratio is less than 0.4, between 0.4 and 0.6, and greater than 0.6, we refer to the household as a "male breadwinner," "egalitarian," and "female breadwinner" household, respectively. Table 9 and Figure 3 (c) show that the pattern persists. Egalitarian households experience the largest losses (about 5.5 percent), followed closely by female breadwinner households (5.3 percent).

Table 10: Spouse's Social Security Wealth by Breadwinner Type

	Wife's SS Wealth		Husband's SS Wealth	
	Male BW Couple	Female BW Couple	Male BW Couple	Female BW Couple
When Both Spouses are Alive (in $1,000)				
Optimal	116.808	156.923	207.911	166.661
Actual	112.076	164.047	226.670	170.510
Relative to Optimal	-3.2%	6.5%	9.2%	1.5%
When Widowed (in $1,000)				
Optimal	116.404	113.079	54.416	48.981
Actual	93.056	85.101	41.521	37.377
Relative to Optimal	-19.7%	-24.7%	-24.6%	-23.7%
Total (in $1,000)				
Optimal	233.211	270.002	262.327	215.642
Actual	205.132	249.148	268.192	207.886
Relative to Optimal	-12.0%	-7.3%	2.3%	-4.0%

3.1.1 Spousal Asymmetries and The Gender Puzzle

Tables 10–11 and Figures 3 (b) and (d) highlight a systematic gender asymmetry. Wives consistently lose more than their husbands, regardless of household type. In male breadwinner households, wives forgo 12 percent of potential wealth, while their husbands slightly exceed the optimum. In female breadwinner households, wives lose 7 percent compared to 4 percent for husbands. Under the PIA ratio classification, wives' shortfalls range from 5 to 12 percent, while husbands' gaps fluctuate around zero.

The asymmetry raises a puzzle: why do wives bear disproportionate losses, even when they are the primary earner? In male breadwinner households, husbands effectively "overclaim," capturing slightly more than the optimal PV at the cost of their wives' benefits. In female breadwinner households, wives still retire earlier than optimal, undermining their own benefits and survivor protection for their husbands. These patterns point to a lack of household coordination to maximize joint wealth, with decisions apparently tilted toward husbands' incentives rather than joint optimization.

Table 11: Spouse's SS Wealth by Alternative Breadwinner Classification

Panel A: Wife's SS Wealth			
	Male BW Couple	Egalitarian Couple	Female BW Couple
When Both Spouses are Alive (in $1,000)			
Optimal	101.926	157.772	148.202
Actual	98.763	155.388	160.065
Relative to Optimal	-2.4%	-0.4%	9.2%
When Widowed (in $1,000)			
Optimal	115.847	117.169	103.548
Actual	93.503	89.489	80.736
Relative to Optimal	-18.8%	-23.8%	-21.7%
Total (in $1,000)			
Optimal	217.772	274.941	251.750
Actual	192.266	244.877	240.802
Relative to Optimal	-11.6%	-10.8%	-4.6%
Panel B: Husband's SS Wealth			
	Male BW Couple	Egalitarian Couple	Female BW Couple
When Both Spouses are Alive (in $1,000)			
Optimal	211.574	193.033	107.647
Actual	229.024	207.888	105.478
Relative to Optimal	8.4%	7.4%	-1.7%
When Widowed (in $1,000)			
Optimal	54.132	53.161	43.859
Actual	41.895	39.372	35.671
Relative to Optimal	-23.5%	-26.5%	-18.9%
Total (in $1,000)			
Optimal	265.706	246.193	151.506
Actual	270.919	247.260	141.149
Relative to Optimal	2.0%	0.4%	-6.8%

3.1.2 Discussion

Taken together, Tables 8–11 and Figure 3 (a)-(d) establish two central facts. First, households leave substantial Social Security wealth unrealized by claiming too early. Second, and more puzzling, wives consistently lose more than husbands. This gender asymmetry is difficult to reconcile with models of household optimization and suggests that intra-household bargaining, social norms, or informational frictions shape retirement behavior in ways that systematically disadvantage women.

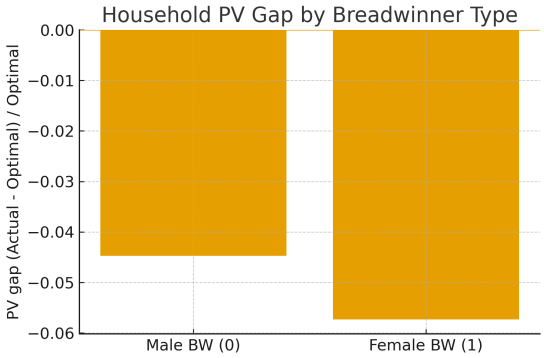
The gender asymmetry we document poses a challenge for standard models of household decision-making, where spouses coordinate claiming to maximize joint welfare, yet our evidence shows systematic deviations that disadvantage wives. One interpretation is that bargaining weights favor husbands, either because they control more resources or because social norms grant them greater influence over retirement timing. Another possibility is informational: households may underappreciate the role of survivor benefits, leading wives—who stand to gain most from delayed claiming—to retire too early. Distinguishing between these mechanisms is critical for understanding whether the observed inefficiencies reflect preferences, power, or frictions, and for designing policies that better align individual incentives with household welfare.

4 Quantitative Model

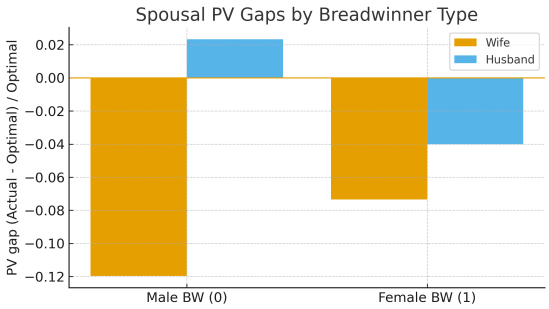
This section presents a dynamic life-cycle model of labor supply, consumption, savings, and Social Security claiming decisions of couples, in which Social Security rules are modeled in great detail to match that of the current U.S. system. Life-cycle from ages $t = 50, ..., 90$ is modeled. A period is a year.

Couples are heterogeneous with respect to permanent breadwinning states, i.e., female-breadwinner and male-breadwinner couples and education level of spouses ($e_{i,j}$), as well as evolving states, including household assets (a_t), hourly wages (w_t), health status (h_t), average lifetime earnings ($\bar{y}_t$), and Social Security claiming status (b^{ss}_{t-1}) of both wives and husbands. Given this vector of states, couples choose optimal household consumption and make work and Social Security benefit application decisions (if eligible) of both spouses to maximize the present discounted value of life-time utility.

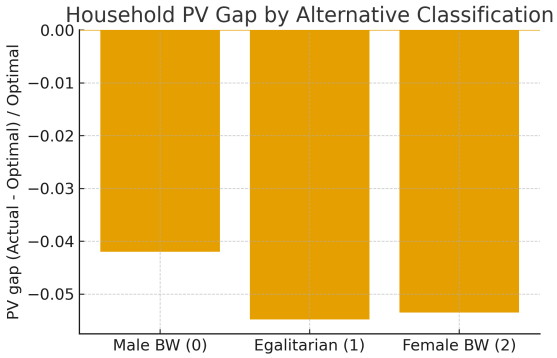
The breadwinning status of a couple is defined by the average lifetime earnings at age 55 ($\bar{y}_t$) of spouses. We categorize a wife as "breadwinner" if her average lifetime earnings exceed her husband's.



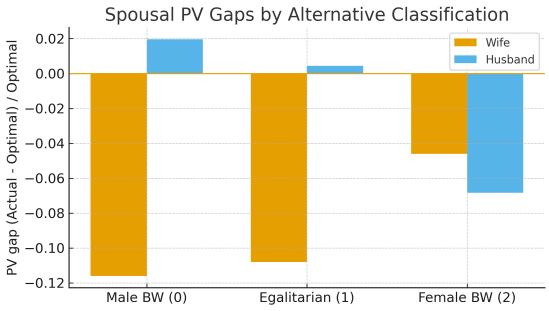
(a) Household PV Gap by Breadwinner Type



(b) Spousal PV Gaps by Breadwinner Type



(c) Household PV Gap by Alternative Breadwinner Classification



(d) Spousal PV Gaps by Alternative Breadwinner Classification

Figure 3: Household and Spousal PV Gap by Female Breadwinner Status.

Notes: Households are categorized using the ratio of primary insurance amounts (PIAs). Egalitarian households are those with ratios between 0.4 and 0.6. These figures plot the percentage shortfall or increase in household/spousal Social Security wealth (actual relative to optimal) for male and female breadwinner households. Negative (positive) values indicate losses (gains) relative to the optimal strategy.

Couples can exogenously dissolve through death or divorce, and we assume no remarriage.

4.1 Sources of Uncertainty

At the beginning of each period t, the couple faces the following exogenous shocks:

1. Mortality shocks: The parameter s_t^j denotes the probability that spouse j is alive at age t conditional on being alive at age $t-1$. The survival probability depends on the spouse's age, previous health status, and education type as: $s_t^j = S(h_{t-1}^j, e^j, t)$. Because individuals live up to a maximum age T, $s_{T+1}^j = 0$ for any h_T^j.

2. Divorce shocks: Even if both spouses survive, the couple may dissolve through exogenous divorce. The divorce probability $\delta_d(h_{t-1}^h, h_{t-1}^w)$ depends on the health status of both spouses (in our data, divorce probability does not depend on education).

   Conditional on the household's survival, the following shocks are realized.

3. Health shocks: In each time period, both husband and wife face uncertainty in health, $h_t^j \in \{0, 1\}$, which takes two values: with 0 being in good health and 1 being in bad health. Household health $h_t = (h_t^h, h_t^w)$, evolves each period according to a Markov process. We allow for correlation between the two spouse's health status as the transition probability jointly depends on the age, previous period's health status, and education type of both spouses. A typical element of the health transition matrix at age t is given by

$$\pi_{j,i,t+1} = Pr(h_{t+1} = j | h_t = i, e^h, e^w, t+1), \qquad i, j \in \{(0,0), (0,1), (1,0), (1,1)\} \quad (9)$$

4. Wage shocks for each spouses

4.2 Preferences

Every single person has preferences over consumption c_t and leisure l_t. For spouse $j \in \{h, w\}$, the within period utility is separable between the two and is given as follows.

$$u(c_t^j, l_t^j) = \frac{(c_t^j/\zeta)^{1-\gamma_c}}{1-\gamma_c} + \psi_j \cdot \frac{{l_t^j}^{1-\gamma_l}}{1-\gamma_l}$$

Where γ_c, γ_l are the coefficient of relative risk aversion and ψ_j is the weight on leisure utility. ζ is the equivalent scale in consumption.

The preferences for a couple is given as follows

$$w(c_t^h, c_t^w, l_t^h, l_t^w) = \theta u(c_t^h, l_t^h) + (1-\theta)u(c_t^w, l_t^w)$$

The parameter θ captures the Pareto weight on husband's utility. Currently, it is assumed that $\theta = 1/2$.

The total amount of leisure in period t for each individual is given by

$$l_t = \bar{l} - n_t - \phi_{emp} \cdot \mathbb{I}\{n_t > 0\} - \phi(h_t) + \phi_{joint} \cdot \mathbb{I}\{n_t^h = n_t^w = 0\} \tag{10}$$

where $\bar{l}$ is the total endowment of leisure each period, $n_t \in \{0, 1000, 2000\}$ is the annual hours corresponding to the discrete labor supply decision (non-employment, part-time, and full-time employment). ϕ_{emp} determines the participation cost incurred if hours worked n_t are positive. $\phi(h_t)$ is the time lost due to bad health. Following Casanova (2010), we model leisure complementarity when both spouses are not working with the parameter ϕ_{joint}.

4.3 Hourly Offered Wages

Each household i receives wage offers and makes labor supply decisions once wages are revealed. The wage offer process evolves according to

$$\log w_{it}^h = \alpha_0^h + \alpha_1^h \cdot t + \alpha_2^h \cdot t^2 + \alpha_3^h \cdot e_i^h + \varphi^h \cdot \mathbf{1}(h_{it}^h = 1) + \zeta_{it}^h + \epsilon_{it}^h \tag{11}$$

$$\log w_{it}^w = \alpha_0^w + \alpha_1^w \cdot t + \alpha_2^w \cdot t^2 + \alpha_3^w \cdot e_i^w + \varphi^w \cdot \mathbf{1}(h_{it}^w = 1) + \zeta_{it}^w + \epsilon_{it}^w \tag{12}$$

$$\zeta_{it}^j = \zeta_{i,t-1}^j + \nu_{it}^j, \quad \begin{pmatrix} \nu_{it}^h \\ \nu_{it}^w \end{pmatrix} \overset{iid}{\sim} N\left[0, \begin{pmatrix} \sigma_{\nu,h}^2 & \sigma_{\nu_{h,w}} \\ \sigma_{\nu_{h,w}} & \sigma_{\nu,w}^2 \end{pmatrix}\right], \quad \zeta_{i,50}^j = \nu_{i,50}^j, \quad j \in \{h, w\} \tag{13}$$

$$\begin{pmatrix} \epsilon_{it}^h \\ \epsilon_{it}^w \end{pmatrix} \overset{iid}{\sim} N\left[0, \begin{pmatrix} \sigma_{\epsilon,h}^2 & \sigma_{\epsilon_{h,w}} \\ \sigma_{\epsilon_{h,w}} & \sigma_{\epsilon,w}^2 \end{pmatrix}\right] \tag{14}$$

where w_{it}^j denotes the hourly wage of spouse $j \in \{h, w\}$. For both spouses, log hourly wages depend on their own age, education type e_i^j, and health status h_{it}^j. Each spouse receives a permanent wage shock ν_{it}^j and a transitory shock ϵ_{it}^j and these two shocks are assumed to be

independent. Following previous studies, the permanent wage shock follows a random walk process. The permanent shock in the first period ($t = 50$) is initialized to $\zeta^j_{i,50} = \nu^j_{i,50}$. The permanent (transitory) wage shocks of the two spouses are assumed to be contemporaneously correlated with covariance $\sigma_{\nu_{h,w}}$ ($\sigma_{\epsilon_{h,w}}$).

4.4 Social Security

The Social Security system in the U.S. provides retirement incentives at the time when these benefits become available. Benefits are computed in several steps. First, the earnings of the 35 highest earning years are averaged into an index – Average Indexed Monthly Earnings (AIME). The AIME increases by working an additional year if earnings in that year are higher than the lowest earnings embedded in it and are also capped at a threshold.

First, we approximate spouse j's average lifetime earnings at age t_b as

$$\bar{y}^j_{t_b} = \frac{\sum_{t=t_0}^{t_b} e^j_t}{35} \tag{15}$$

where t_b denotes the age that an individual first receives Social Security benefits and t_0 denotes the first year of earnings. e^j_t denotes period earnings subject to the maximum taxable earnings e^{max} and is expressed as

$$e^j_t = \min\{w^j_t n^j_t, e^{max}\}. \tag{16}$$

We set $e^{max} = \$118,500$ based on the Social Security maximum taxable earnings in 2015.

The Average Indexed Monthly Earnings (AIME) is computed as

$$AIME(\bar{y}_{t_b}) = \frac{\bar{y}_{t_b}}{12} \tag{17}$$

where $\bar{y}_{t_b}$ denotes the average lifetime earnings (measured at age t_b). In reality, indexed nominal earnings are used when computing the AIME so that benefits reflect the general rise in the standard of living that occurred during the worker's working lifetime. Since all dollar values in the model are in 2019 dollars, equation (17) provides a reasonable approximation of the AIME without the need to introduce a wage index for each calendar year.

Second, AIME is converted to obtain the Primary Insurance Amount (PIA), which de-

termines the monthly Social Security benefits using the following piece-wise linear function:

$$pia(\bar{y}_t) = 0.90 \times \min\{\bar{y}_t, b_0\} + 0.32 \times \min\{\max\{\bar{y}_t - b_0, 0\}, b_1 - b_0\} + 0.15 \times \max\{\bar{y}_t - b_1, 0\} \tag{18}$$

4.4.1 Adjustments

Monthly Social Security benefits are further adjusted to account for a penalty/credit for claiming early/late (Γ_t): $pia(\bar{y}_t) \cdot \Gamma_t$.

SS benefits can be claimed without any penalty at the normal retirement age (t_{NRA}).[4] However, individuals can claim benefits with some penalty starting the Early Retirement Age (t_{ERA}) of age 62. For every year before the NRA that these benefits are claimed, the Social Security amount received is permanently reduced by the early claiming penalty. Individuals can also delay their benefit claim beyond NRA. In that case, future benefits are permanently increased by the delayed claiming credit.

This penalty or credit shows up at a percentage decrease, γ_t^{ss}, for each year prior to the normal retirement age that a worker claims or a percentage increase for each year after the normal retirement age that a worker delays claiming.

$$\Gamma_t = \begin{cases} (1-\gamma_t^{ss})^{(t_{NRA}-t)} & \text{if } t < t_{NRA} \\ 0 & \text{if } t = t_{NRA} \\ (1+\gamma_t^{ss})^{(t-t_{NRA})} & \text{if } t > t_{NRA} \end{cases} \tag{19}$$

4.4.2 Marriage Related Benefits: Spousal and Survivors benefits

For couples, there is an additional benefit provided by the Social Security system called the spousal benefits. Married individuals can decide to claim their own benefits based on their own earnings record or 50% of their spouse's benefits (whichever is higher). Individuals are entitled to 50 percent of spouse's benefits through Social Security, as soon as they reach the age of eligibility (62). At the same time, they can switch to the higher of the two benefits as a later date.

[4] The NRA is slightly different for different birth cohorts.

4.5 Budget Constraint

In each period, the household faces the budget constraint

$$A_{t+1} = (1+r)A_t + \sum_{j\in\{h,w\}} w_t^j n_t^j + ssb_t + I_t + T_t - c_t - \tau_t - m_t \tag{20}$$

where the household receives asset income rA_t, labor income $w_t^h h_t^h + w_t^w h_t^w$, Social Security benefits ssb_t, all other sources of non-labor income I_t, and government transfers T_t. The household consumes c_t and also incurs payroll and federal taxes τ_t and out-of-pocket medical expenses m_t.

4.5.1 Taxes

Household taxes $\tau_t = \tau(A_t, w_t^h n_t^h, w_t^w n_t^w, ssb_t, I_t)$ are computed as the sum of payroll taxes of both spouses and federal income tax ($\tau_t = \tau_{P,t}^h + \tau_{P,t}^w + \tau_{F,t}$). State income taxes are not modeled due to wide variation in state tax codes.

Payroll tax – Payroll tax consists of Social Security and Medicare tax. Social Security tax is 6.2% of earnings capped at the maximum taxable earnings while the Medicare tax rate is 1.45% and earnings are uncapped. Therefore, each spouse's payroll tax $\tau_{P,t}^j$ is specified as

$$\tau_{P,t}^j = 0.062 \times \min\{w_t^j n_t^j, e^{max}\} + 0.0145 \times w_t^j n_t^j, \quad j \in \{h, w\}. \tag{21}$$

Federal income tax – Federal income tax is a progressive tax on labor and non-labor income. First, define taxable household income (TI_t) as the sum of asset income, earnings, unemployment benefits, taxable Social Security benefits (tb_t), and all other non-labor income, subtracted by the standard household deduction (d).

$$TI_t = \max\{rA_t + w_t^h n_t^h + w_t^w n_t^w + tb_t + I_t - d, 0\} \tag{22}$$

I set d as $d = \$12{,}600$ based on the standard deduction for married households filing jointly in 2015. Taxable Social Security benefits are computed according to Table 12.

Similar to the PIA computation formula, the federal income tax has seven progressive tax rates that are applied to seven taxable income brackets. Table 13 reports the amount of federal income tax $\tau_{F,t}$ that the household pays based on taxable household income TI_t. I use the 2015 income tax brackets for married households filing jointly.

Table 12: Taxable Social Security Benefits for Married Taxpayers (in $)

Provisional Income†	Taxable Social Security Benefits
(A) Less than $32,000	None
(B) $32,000 to $44,000	Lesser of 50% of benefits or 50% of provisional income above $32,000 (max $6,000)
(C) Greater than $44,000	Lesser of 85% of benefits or 85% of provisional income above $44,000 plus the amount from line (B)

Source: Table 1 from Congressional Research Service, *Social Security: Taxation of Benefits* (CRS Report RL32552), June 12, 2020.
† Provisional income is defined as the sum of asset income, earnings, all other sources of non-labor income excluding Social Security benefits, and 50% of Social Security benefits.

Table 13: Federal Income Tax by Taxable Household Income Brackets (in $)

Taxable Household Income (TI_t)	Federal Income Tax ($\tau_{F,t}$)
0 - 18,450	$0.1 \times TI_t$
18,451 - 74,900	$1,845 + 0.15 \times (TI_t - 18,450)$
74,901 - 151,200	$10,312.5 + 0.25 \times (TI_t - 74,900)$
151,201 - 234,500	$29,387.5 + 0.28 \times (TI_t - 151,200)$
234,501 - 411,500	$51,577.5 + 0.33 \times (TI_t - 234,500)$
411,501 - 464,850	$111,324 + 0.35 \times (TI_t - 411,500)$
464,851+	$129,996.5 + 0.396 \times (TI_t - 464,850)$

Note: All values are in 2015 dollars.

4.5.2 Transfers

There is a standard consumption floor which guarantees a minimum level of consumption:

$$c_t \geq \bar{c} \tag{23}$$

Government transfers, tr_t, bridge the gap between this minimum level of consumption and individual's liquid resources. This is a simple approximation to the federal safety net programs in the U.S. like Supplemental Nutritional Assistance Program (SNAP), Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), and other programs.

$$tr_t = \min\{0, \underline{c} - (Y_t + ssb_t)\} \tag{24}$$

4.6 Terminal Utility Upon Household Dissolution

Individual behavior after the dissolution of a married household (due to divorce or the death of one or both spouses) is not explicitly modeled. Instead, the surviving spouse j receives a terminal utility $v(W_t^j)$ specified as

$$v(W_t^j) \quad = \quad \frac{\theta_{beq}}{1-\gamma_c}\Big(W_t^j + \kappa_{beq}\Big)^{1-\gamma}, \quad j \in \{h, w\} \tag{25}$$

where $W_t^j = W_t^j(a_t^j, \bar{y}_t^h, \bar{y}_t^w)$ denotes the sum of spouse j's wealth (a_t^j) and the present discounted value of the stream of (future) retirement benefits (based on the surviving spouses' average lifetime earnings and the deceased spouses' average lifetime earnings as surviving spouses may receive survivors benefits). The term $\kappa_{beq} \geq 0$ is a shifter that affects the curvature of $v(W_t^j)$ and governs the degree to which households are risk-averse over consumption and W_t^j. This allows households to be less risk-averse over W_t^j than consumption (for instance, due to potential government transfers that spouse j can receive when they become single). The functional form of equation (25) is commonly used in the literature that models bequest motives as its parameters are easy to interpret and can support various interpretations of bequest motives.

The value of a_t^j depends on whether spouse j is a widow/er or divorcee. Widow/ers are assumed to receive all of the household's assets ($a_t^j = A_t$) while divorcees split the household's assets equally ($a_t^h = a_t^w = \frac{1}{2}A_t$).

4.7 Recursive Formulation

Let $\boldsymbol{X}_t$, be the period t state vector. Then couples solve a finite-horizon Markovian decision problem where they choose a sequence of consumption $\{c(z_t)\}_{t=1}^T$, hours $\{n(z_t)\}_{t=1}^T$ and Social Security benefit application $\{b^{ss}(z_t)\}_{t=1}^T$ rules to maximize the expected discounted lifetime utility subject to the exogenous processes for survival, and labor earnings, a set of budget, borrowing, and time constraints, government transfer rule, and policies for taxes and Social Security.

$$
\begin{aligned}
V_t(\boldsymbol{X}_t) \;=\; & \max_{c_t, n_t^h, n_t^w, B_t^h, B_t^w} w(c_t^h, c_t^w, l_t^h, l_t^w) \\
& + \beta \Big\{ \big(1 - s_{m,t}^h(h_t^h, e^h)\big)\big(1 - s_{m,t}^w(h_t^w, e^w)\big)\big(1 - \delta_d(h_t^h, h_t^w)\big) E_t\big[V_{t+1}(\boldsymbol{X}_{t+1}|\boldsymbol{X}_t)\big] \\
& + \big(1 - s_{m,t}^h(h_t^h, e^h)\big)\big(1 - s_{m,t}^w(h_t^w, e^w)\big)\; \delta_d(h_t^h, h_t^w)\big(\sum_{j \in \{h,w\}} v(W_{t+1}^j)\big) \\
& + \big(1 - s_{m,t}^h(h_t^h, e^h)\big) \cdot s_{m,t}^w(h_t^w, e^w) \cdot v(W_{t+1}^h) \\
& + s_{m,t}^h(h_t^h, e^h) \cdot \big(1 - s_{m,t}^w(h_t^w, e^w)\big) \cdot v(W_{t+1}^w) \;\Big\}
\end{aligned}
$$

$$
\boldsymbol{X}_t = \big\{A_t, h_t^h, h_t^w, \bar{y}_t^h, \bar{y}_t^w, DI_t^h, DI_t^w, B_{t-1}^h, B_{t-1}^w, e^h, e^w, \zeta_t^h, \zeta_t^w\big\}
$$

The life cycle of an individual between ages 55 and 99 is divided into three distinct phases. The first is the *employment* phase between ages 55 and 61 where individuals make consumption, savings, and employment decisions.[5]The second is the *retirement choice* phase between ages 62 and 69 where individuals also make Social Security application decisions (b_t^{ss}). Finally there is a *retired* phase where individuals make only consumption and savings decisions.

5 Estimation

The model is estimated using a two-step Method of Simulated Moments (MSM) estimation strategy, as standard in the literature. In the first step, I estimate or calibrate the parameters that can be cleanly identified without explicitly using my model. These parameters are derived directly from data, based on existing literature evidence, or calculated from program rules.

In the second step, taking the parameters that were estimated in the first step as given, I use the Generalized Method of Moments (GMM) techniques to estimate the remaining preference parameters: $\Theta = (\gamma, \nu, \theta_p^{h=0}, \theta_p^{h\neq 0}, \varphi, \phi, L, \beta, \theta_b, \kappa)$. The objective is to find a vector of parameters Θ that generates simulated decision profiles that *best match* (measured by a GMM criterion function) the corresponding profiles from the data.

[5]We do not allow individuals to claim disability benefits in the model for now.

5.1 First-Step Estimation

We use the HRS data sets for the first-step estimation. In addition, I borrow parameters, such as the consumption floor ($\underline{c}$) and the pre-tax interest rate (r), from previous literature, and I compute the SS related parameters using the information from the SSA, including health transitions, survival probabilities, out-of-pocket medical spending, spousal earnings, wage profiles, wage process, initial distributions, and SS program rules.

5.2 Second Step Estimation

In the second step, I use GMM techniques to estimate the remaining nine preference parameters: $\Theta = (\gamma, \nu, \theta_p^{h=0}, \theta_p^{h=1,2}, \phi, L, \beta, \theta_b, \kappa)$. The objective is to find a vector of preference parameters $\hat{\Theta}$ that minimizes the weighted distance between the estimated target profiles from the PSID and the simulated profiles generated by the model. The estimator $\hat{\Theta}$ is given by the minimized GMM criterion function:

$$\hat{\boldsymbol{\theta}}_{\boldsymbol{s}} = argmin_{\boldsymbol{\theta_s}} \big(\boldsymbol{m_d} - \boldsymbol{m_s}(\hat{\boldsymbol{\theta}}_{\boldsymbol{f}}, \boldsymbol{\theta_s})\big)' \, \hat{W} \, \big(\boldsymbol{m_d} - \boldsymbol{m_s}(\hat{\boldsymbol{\theta}}_{\boldsymbol{f}}, \boldsymbol{\theta_s})\big) \tag{26}$$

where τ is the ratio of the number of observations to the number of simulated observations and $\hat{\varphi}(\Theta; \chi)$ is a vector of moment conditions that my model is estimated to match:

1. Employment by health status (healthy and unhealthy) and ages (55-69) for both spouses in each marriage type
2. Mean and median assets over ages (55-69) for couples in each marriage type
3. Joint retirement over ages (55-69) for couples in each marriage type
4. Claiming by health status for both spouses in each marriage type

This gives a total of $14 \times \mathbb{T} = 210$ moment conditions.

6 Estimation Preliminary Results

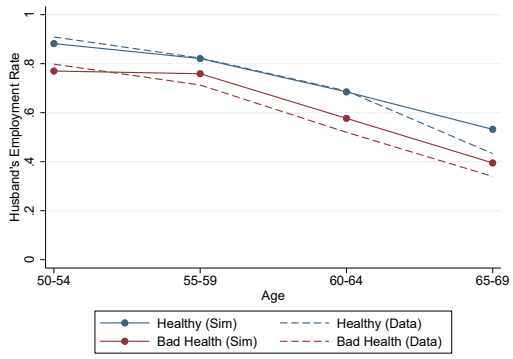
The estimated structural parameters are presented in Table 14. Figure 4 displays the life-cycle profiles of decision variables from the HRS alongside profiles generated from the model estimation. The model fits these targeted data profiles very well and reproduces the observed key patterns of participation and savings for individuals by health of husbands and wives over their life cycle.

Table 14: Estimation Results: Parameters

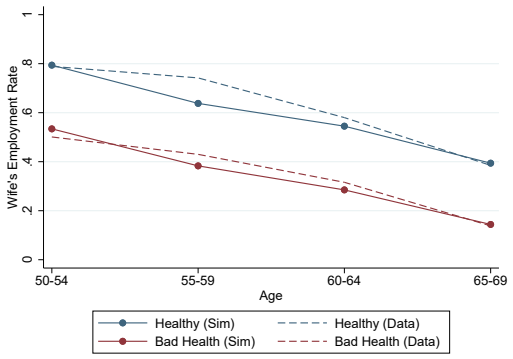
Calibrated Parameters			
γ_c	1.5	γ_l	1
θ	0.5	$\bar{L}$	5,840
Preference Parameters			
ψ^h	0.0184	ψ^w	0.0159
ϕ^h_{emp}	177	ϕ^w_{emp}	201
$\phi^h(h_t)$	2,213	$\phi^w(h_t)$	2,592
ϕ_{joint}	494	$\bar{c}$	22,080
θ_{beq}	103	κ_{beq}	46,245
Wage Parameters			
α^h_0: constant	0.751	α^w_0	0.428
α^h_1: age	0.097	α^w_1	0.090
α^h_2: age sq.	-0.099	α^w_2	-0.104
α^h_3: college	0.798	α^w_3	0.689
φ^h: bad health	-0.225	φ^w	-0.204
$\sigma_{\nu,h}$	0.181	$\sigma_{\nu,w}$	0.099
$\sigma_{\epsilon,h}$	0.143	$\sigma_{\epsilon,w}$	0.166
$\sigma_{\nu_{h,w}}$	-0.010	$\sigma_{\epsilon_{h,w}}$	0.010

7 Counterfactual Policies

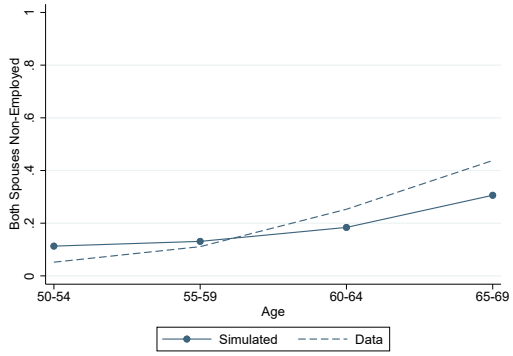
We then conduct counterfactual analyses to evaluate the distributional and welfare consequences of alternative Social Security policy designs. While the share of dual-earner and female-breadwinner families has risen sharply, the current Social Security benefit design is still largely based on the traditional one-earner model. Under current rules, conditional on the same total household earnings, one-earner couples receive higher Social Security benefits than dual-earner couples due to the current design of spousal benefits. This design feature has sparked debate about whether Social Security should be reformed to achieve "marriage neutrality." Our model allows us to perform novel counterfactual policy reforms that have been proposed to make the system more marriage-neutral while preserving its financial sustainability, such as earnings sharing (i.e., combining a couple's earnings and splitting them equally when computing Social Security benefits) and adjusting spousal and survivor's benefits.



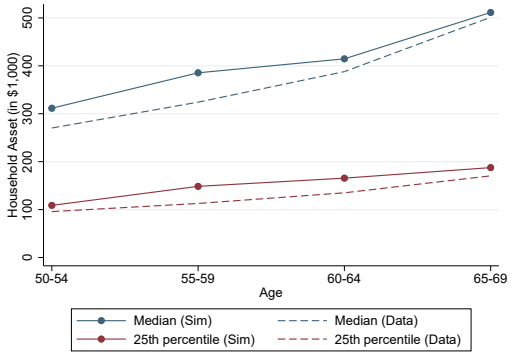
(a) Husband's Employment Rate by Health



(b) Wife's Employment Rate by Health



(c) Both Spouses Non-employed



(d) Household Assets

Figure 4: Estimation Results: Data vs. Estimated Profiles

8 Conclusion

This paper shows that as women increasingly become primary earners, retirement and Social Security claiming decisions within married households depart systematically from joint optimality. Using linked HRS–SSA data, we document large and persistent gaps between actual and household-optimal claiming, with losses that are especially pronounced for female breadwinner couples. Despite higher earnings and better health, wives, including primary earners, consistently bear a disproportionate share of Social Security wealth losses, particularly through reduced survivor benefits. These patterns reflect a combination of joint retirement incentives, health sorting, and institutional features of the Social Security system that continue to embed a one-earner household logic. As a result, observed behavior is tilted toward husbands' incentives rather than household-level wealth maximization, generating gendered inefficiencies even in dual-earner and female-breadwinner families.

Ongoing work incorporates these mechanisms into a dynamic life-cycle model of married households with detailed Social Security rules, allowing us to quantify the roles of leisure complementarities, bargaining power, and health dynamics in shaping claiming and retirement decisions. The model will be used to evaluate the distributional and welfare consequences of alternative policy designs, with particular attention to marriage-neutral reforms such as earnings sharing and adjustments to spousal and survivor benefits. By aligning Social Security institutions with contemporary household structures, this analysis aims to inform policy reforms that reduce gendered distortions while preserving insurance value in an aging population.

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