Demand for Spousal Health *

Elena Capatina, Hyunjae Kang

January 2024

Abstract

This paper explores the importance of health for marital transitions and as a dimension for assortative mating. We present new empirical patterns on marriage, divorce, and assortative mating in relation to health, constructed over time and by race using US data from 1996-2023. We document that high fractions of unhealthy individuals are single, lack health insurance, and relatively small fractions have healthy spouses. Unhealthy men have become significantly more likely to be single over time. Unhealthy individuals are also more likely to be divorced and remain single. When married, unhealthy individuals have high rates of unhealthy spouses (40-45%), higher probabilities of "marrying down" in terms of education, and women have husbands with lower incomes (conditional on everything else) compared to their healthy counterparts. These findings have important implications for the design of health and social insurance programs which interact closely with intra-household insurance. Preliminary analysis shows the ACA is associated with a lower penalty of bad health in the marriage market. Finally, the gain to marriage for females with low education but good health surpasses that of females with high education but poor health. Conversely, the gain to marriage for males exhibit the opposite pattern. This asymmetry was noticeable in the mid-'90s but has since diminished in recent years. We develop a multidimensional matching model of education and health status to reveal the driving forces behind changes in the demand for spousal health.

Keywords: Health, Matching, Marriage, Intra-household risk-sharing, Health Insurance

JEL classification: I10, I14, J12

*Capatina: Australian National University; Kang: Kyoto University. We would like to thank Edoardo Ciscato, Chung Tran, Fedor Iskhakov, and Esben Andersen for excellent comments and feedback.

1. Introduction

Health and health shocks are important determinants of earnings, wealth, life-expectancy, human capital, medical expenditures, and ability to have and raise children (e.g., French (2005), De Nardi et al. (2010), Capatina (2015), De Nardi et al. (2022), Capatina and Keane (2023)). In the context of marriage markets, these aspects matter greatly for couples' marital surpluses.

This paper explores the importance of health for marital transitions and as a dimension of assortative mating. We present new empirical patterns on marriage, divorce, fertility and assortative mating in relation to health, constructed over time and by race using US data from 1996-2023. We use individuals aged 20-64 and study Whites, Blacks and Hispanics separately. We highlight the importance of these patterns for the degree of intra-household risk sharing, the value of formal social and health insurance, and in explaining household income inequality. We aim to understand the underlying mechanisms behind the change in demand for spousal health over time. We build a multi-dimensional matching model of health status and education to empirically quantify the impact of health characteristics on marital matching, taking into account age-related equilibrium effects in the marriage market.

First, we document that high fractions of unhealthy individuals are single, and relatively small fractions have healthy spouses in 2022-23. Unhealthy Whites are the most likely to have a healthy spouse (approximately 25%) while Blacks are least likely (12-13%). However, Whites have become significantly less likely to have a healthy spouse over time, losing approximately 10pp since 1996-97. These patterns suggest that intra-household insurance against bad health is generally low, varies significantly by race, and has declined for Whites.

Another interesting aspect is how marriage has been replaced by cohabitation within different racial/sex/health groups. Marriage rates have declined by approximately 9pp from 1996/97 to 2022/23 for White healthy individuals, but this has been made up by an equal increase in cohabitation. Marriage rates have decreased by more among the unhealthy sub-sample (16pp for men and 13pp for women). Women saw an equal increase in cohabitation, but unhealthy men only experienced a 9pp rise. Thus, unhealthy White men are increasingly left out of formal marriages as well as cohabitation arrangements

that might provide some limited risk-sharing. The patterns also indicate that unhealthy individuals are increasingly foregoing the benefits of forming a family with a married spouse, such as raising children in a married household.

We also document that White single individuals have the highest rates of private health insurance (PHI) relative to other races, but they are also the only group for whom the PHI rates have *declined* over time despite the ACA, while Blacks and Hispanics unhealthy singles have experienced significant increases in coverage bringing them almost in line with Whites. Approximately only one third of unhealthy singles have PHI in 2022/23. Hence, for White unhealthy men who increasingly lack a spouse, formal health insurance has not offset the lost benefits of intra-household risk sharing. This is especially important because the rates of bad health among Whites have steadily increased over time, rising from 12 to 15%.

Second, we explore the correlation between own health and spousal characteristics for married individuals. When married, unhealthy individuals have high rates of unhealthy spouses (40-45%), higher probabilities of "marrying down" in terms of education, and unhealthy women have husbands with lower incomes (conditional on everything else) compared to their healthy counterparts. The latter is partly explained by the fact that the husbands of unhealthy women are also often unhealthy, but the relationship is still evident even among couples where the husband is healthy. This spouse income penalty to bad health has increased over time.

Third, preliminary analysis suggests that the Affordable Care Act (ACA) is associated with a lower penalty of bad health in the marriage market.

Fourth, utilizing the marriage matching function proposed by Choo and Siow (2006), we demonstrate that the relative gain from marrying a spouse with low education and good health, in contrast to marrying a spouse with high education and bad health, is significantly higher for males, a trend not observed among females. This gender asymmetry is pronounced in 1996, diminishes over time, and eventually disappears in recent years.

Lastly, we construct and estimate a multidimensional matching model to address the gender asymmetries in the health dimension in marital matching. The theoretical framework can capture the gender-specific demand for spousal health, accommodating

changes in returns to education and good health, and considering age-related equilibrium effects in the marriage market.

We conclude with a discussion of the implications for the design of health and social insurance programs which interact closely with intra-household insurance. A healthy spouse can compensate for the partner's poor health by working, taking care of the unhealthy spouse, or increasing time allocated to home production and childcare. On average, the absence of a healthy spouse implies a higher burden of bad health and a higher value of formal insurance.

2. Literature

The literature studying matching patterns is dominated by models focusing on a single characteristic driving the matching process. Income, wages, and education are the most common examples of such a characteristic (e.g., Becker (1993); Pencavel (1998); Choo and Siow (2006)). Driven by empirical evidence, a growing literature builds multidimensional models studying how non-income traits are traded off with income. Chiappori et al. (2012) study the trade-offs between the economic dimension (i.e., wages or education) and physical attractiveness (i.e., BMI). Low (2023) use a bi-dimensional matching framework where the tradeoff is between human capital and reproductive capital (fertility).

In our paper we consider health for the first time as an important dimension for matching in the marriage market. Physical attributes and BMI measures that have been previously studied are rough indicators of health, however, health is important for reasons beyond physical attractiveness due to its impact on economic aspects such as productivity (both outside and inside the home), life-expectancy, medical expenditures, and fertility. As far as we are aware, only one paper has studied health and matching. Guner et al. (2018) analyze the health gap between married and unmarried individuals of working-age, distinguishing between selection effects and the protective role of marriage. They find that better innate health is associated with a higher probability of marriage and a lower probability of divorce, and there is strong assortative mating among couples by innate health. They also find that the marriage health gap is similar for men and women.

A new aspect of our paper is to study differences across genders and races, and over time. The focus on gender is partly motivated by the fact that different parental roles and

the gender-wage gap may imply an asymmetry in the value of health. Women's health is key for fertility and for the health and success of children (e.g. Eshaghnia and Heckman (2023)). Previous studies support the idea that mothers' health is more important to children's welfare than the health of the father. Mothers' health is fundamental to the health of newborn babies and children (Lawn et al. (2006)). Bratti and Mendola (2014) provide empirical evidence that co-living children of ill mothers, but not of ill fathers, are significantly less likely to be enrolled in education at ages 15–24. The focus on race is motivated by very different marital patterns by race in the U.S. and very low rates of interracial marriages (e.g., Ciscato (2023)).

In Low (2023), the gender asymmetry arises entirely due to fertility. We add to this research by providing more specific empirical support for how health in general is traded off with income. While Low (2023) uses age-specific effects to explain the asymmetry, we do this more generally by highlighting marriage market equilibrium effects. We do not model the human capital investment process itself as in Low (2023), and instead take it as given.

Our paper is also closely related to the literature on intra-household risk sharing. The income of a worker's spouse plays a major role in consumption insurance (e.g., Blundell et al. (2016)). Ortigueira and Siassi (2013) and Choi and Valladares-Esteban (2020) study the role of a spouse's labor supply as an insurance mechanism in a Bewley framework with exogenous income risks. We add to this literature by explicitly studying intra-household risk sharing in the context of health risk, keeping in mind that household formation is endogenous and may depend on the social and health insurance environment (e.g., Persson (2020)).

3. Data

3.1 CPS

We use the ASEC (March) sample of the CPS from 1996 to 2023. We keep adult civilians aged 20-64 with positive sampling weights. We construct a binary variable for health status equal to one (bad) if self-reported health status is Fair or Poor, or the person has a work disability. Self-reported health is not available before 1996.

3.2 The Medical Expenditures Panel Survey (MEPS)

The MEPS is a set of large-scale surveys of families and individuals, their medical providers, and employers. The survey uses an overlapping panel design collecting data in a series of five rounds of interviews over a 2 and a half year period. A new panel enters the survey every year. We use the MEPS Household Component which collects data from a sample of civilian non-institutionalized families and individuals drawn from a nationally representative sub-sample of households. We use years 2001-2021.[1]

4. Health and Marriage: Descriptive Patterns

4.1 Health and Marital Status over Time

To begin, we study health and marital patterns across different demographic groups and over time. Table 1 shows the fraction of individuals aged 20-64 in bad health by race, marital status and sex, pooling all years. We see that married individuals are significantly healthier than singles in all sub-groups. Also, Black groups are significantly more likely to be unhealthy.

Table 1: Fraction in Bad Health, ages 20-64, CPS

	White		Black		Hispanic	
	Marital Status		Marital Status		Marital Status	
	Single	Married	Single	Married	Single	Married
male	0.167	0.111	0.231	0.169	0.137	0.122
female	0.180	0.116	0.230	0.169	0.173	0.132

Figure 1 shows the fraction of individuals aged 20-64 in bad health by race and sex over time. Whites are becoming less healthy. An interesting question is whether this trend has affected marital patterns over time.

[1] Key variables on health, health behaviors and employment are missing before 2001 (e.g., BMI and chronic conditions).

Figure 1: Fraction in Bad Health, ages 20-64, CPS, men (left) and women (right)

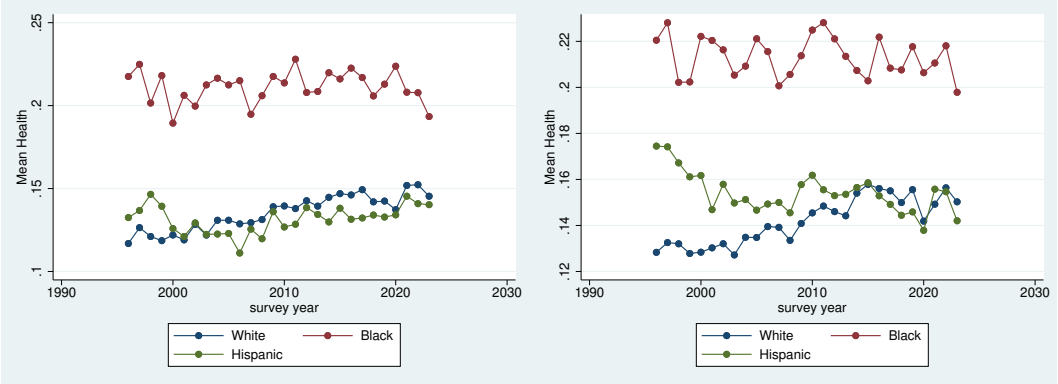


Table 2 shows the fraction of married and cohabiting individuals by health status over time, separately by race. We focus on the first two years in our sample (1996-97) and the last two years (2022-23). We note that marriage rates decline in all groups, but the largest drops are observed among unhealthy males, especially White and Hispanic. Among unhealthy Whites, the marriage rate declines by 13pp for women and 16pp for men. The marriage rate declined by 18pp for Hispanic unhealthy men. To what extent is declining marriage offset by higher cohabitation? For Whites, we see that for healthy groups and unhealthy women, cohabitation fully offsets the marriage decline. However, unhealthy White males had only a 9pp increase in cohabitation compared to a 16pp drop in marriage. If formal marriage is associated with a higher degree of intra-household risk sharing than cohabitation, the shifts indicate that all groups may have lower insurance from a spouse today than in the late 1990's, but White unhealthy men in particular are affected the most as they become less likely to have a partner at all, even if only cohabiting.

Blacks stand out as having the lowest marriage rates but highest cohabitation rates. The declines in marriage among those in bad health has been less severe than for Whites. Overall, the patterns in Table 2 suggest that health is a very important correlate of marriage and cohabitation. However, because cohabitation does not imply the same degree of intra-household risk sharing as marriage, we focus on married couples in the remaining sections of the paper.

Table 2: Fractions Married and Cohabiting, ages 20-64, CPS

	Good Health Time Period		Bad Health Time Period	
	1996-97	2022-23	1996-97	2022-23
White				
male				
Married	0.645	0.568	0.566	0.404
Cohabiting	0.053	0.143	0.062	0.156
female				
Married	0.667	0.604	0.571	0.441
Cohabiting	0.050	0.135	0.061	0.186
Black				
male				
Married	0.421	0.358	0.332	0.252
Cohabiting	0.115	0.213	0.124	0.236
female				
Married	0.363	0.335	0.278	0.240
Cohabiting	0.098	0.185	0.090	0.195
Hispanic				
male				
Married	0.553	0.474	0.555	0.388
Cohabiting	0.066	0.159	0.071	0.176
female				
Married	0.600	0.515	0.515	0.450
Cohabiting	0.063	0.159	0.053	0.137

Next, we study the spouse's status of unhealthy individuals by race and sex over time. Table 3 shows 4 categories: no married spouse, married spouse who is in bad health, married spouse in good health, and married spouse whose health information is missing. A key statistic is the fraction of unhealthy individuals with healthy spouses as this is likely the group that benefits the most from risk-sharing when faced with bad health. We see that unhealthy Whites are most likely to have a healthy spouse, followed by Hispanics. Unhealthy Blacks have a healthy spouse only 11-14% of the time. We note that in 1996-97, White unhealthy males had the highest fractions of healthy spouses (34%). However, this declined to only 24% in 2022-23. We also see a significant decline for White women (-8pp) and Hispanic men (-9pp). These numbers indicate that intra-family risk sharing

when faced with health shocks may be declining over time for Whites, but remains the lowest for Blacks.

Table 3: Spouse Status of Individuals in Bad Health, ages 20-64, CPS

	male		female	
	Time Period		Time Period	
	1996-97	2022-23	1996-97	2022-23
White				
Spouse Status=No Spouse	43.4	59.6	42.9	55.9
Spouse Status=Bad Health Spouse	21.2	14.3	23.2	15.5
Spouse Status=Good Health Spouse	33.7	23.6	32.1	25.4
Spouse Status=Spouse Health N/A	1.8	2.5	1.8	3.2
Black				
Spouse Status=No Spouse	66.8	74.8	72.2	76.0
Spouse Status=Bad Health Spouse	17.3	9.4	14.8	9.3
Spouse Status=Good Health Spouse	14.1	13.6	11.1	12.1
Spouse Status=Spouse Health N/A	1.8	2.2	1.9	2.7
Hispanic				
Spouse Status=No Spouse	44.5	61.2	48.5	55.0
Spouse Status=Bad Health Spouse	25.2	15.9	24.0	17.9
Spouse Status=Good Health Spouse	24.8	16.6	22.4	21.1
Spouse Status=Spouse Health N/A	5.5	6.3	5.1	6.0

Notes: The table considers only married spouses.

4.2 Health Insurance, Health and Marriage

In this section, we study the correlation between health, marriage and health insurance. Table 4 reports the fractions of individuals married, separating the sample into those with and without private health insurance (PHI). As expected, insured individuals are more likely to be married, likely due to higher socioeconomic status.

We see that healthy individuals are more likely to be married than the unhealthy, and the gap is roughly 3-5pp for most groups. However, White and Hispanic women in bad health are 10pp less likely to be married than their healthy counterparts. Women often get PHI from their husbands, so their PHI status is co-determined with their marital status, explaining some of the difference. However, formal health insurance might enable/protect marriage for those with bad health, and might be especially important in

this aspect for White and Hispanic women. We explore this further when we study the effects of the ACA on marital patterns.

Table 5 presents this information differently, showing health status by marital status, sex, race and insurance. We see that singles and married individuals have similar health if they are covered by insurance. But among the uninsured, married individuals are healthier, especially women.[2]

The above findings are opposite to Guner et al. (2018) who find that there is no significant marriage health gap among the uninsured, but there is a significant gap for the insured.[3] While their results suggest that insurance is a facilitator for the positive effects of marriage on health (potentially through healthy behaviors), our results suggest other possible effects which we aim to explore further in future versions.

In Table 6, we study PHI rates for single individuals over time, since this group is likely most vulnerable to consumption changes in the face of health shocks. While Whites have the highest rates of PHI relative to other races, they are also the only group for whom the PHI rates have *declined* over time among those in bad health, despite the ACA, while Blacks and Hispanics unhealthy singles have experienced significant increases in coverage bringing them almost in line with Whites (approximately one third). White unhealthy men increasingly lack a spouse *and* also formal health insurance. This is a concerning finding especially in light of Figure 1 which shows White men are getting less healthy over time.

[2]Regression analysis controlling for age, education and year dummies indicate that the correlations hold after controlling for such demographics.

[3]Guner et al. (2018) use PSID data from 1984-2013 and construct their health measure based on self-rated health.

Table 4: Fraction Married by Private Health Insurance, ages 20-64, CPS

	Private Health Insurance			
	Not Covered by PHI		Covered by PHI	
	Good Health	Bad Health	Good Health	Bad Health
male				
White	0.380	0.346	0.655	0.636
Black	0.242	0.214	0.479	0.511
Hispanic	0.454	0.415	0.565	0.600
female				
White	0.458	0.354	0.669	0.645
Black	0.218	0.179	0.408	0.413
Hispanic	0.504	0.406	0.599	0.602

Notes: The insurance variable used (HINSEMP) indicates whether respondents had any employer-sponsored health insurance coverage during the previous year.

Table 5: Fraction Unhealthy by Private Health Insurance, ages 20-64, CPS

	Private Health Insurance			
	Not Covered by PHI		Covered by PHI	
	Single	Married	Single	Married
male				
White	0.319	0.287	0.089	0.083
Black	0.354	0.319	0.106	0.119
Hispanic	0.183	0.160	0.081	0.093
female				
White	0.350	0.259	0.100	0.091
Black	0.348	0.294	0.124	0.126
Hispanic	0.232	0.169	0.102	0.103

Table 6: Fraction of Singles with PHI, ages 20-64, CPS

	Good Health Time Period		Bad Health Time Period	
	1996-97	2022-23	1996-97	2022-23
White				
male	0.703	0.756	0.380	0.359
female	0.731	0.764	0.411	0.384
Black				
male	0.516	0.648	0.191	0.256
female	0.544	0.665	0.280	0.313
Hispanic				
male	0.405	0.536	0.235	0.308
female	0.416	0.529	0.180	0.321

4.3 Divorce and Health

Health shocks are often associated with medical expenditures, lower ability to work (outside and inside the home), and possibly lower fertility and life expectancy. For these reasons, the spouse may find it optimal to exit a marriage with someone who enters bad health. We expect health and social insurance that cushion the impact of the shock on household resources to dampen the effect on marriage dissolution. In addition, Chen (2023) find health insurance causes a "marriage lock" in which couples in the U.S. stay married for the sake of maintaining health insurance coverage.[4]

We begin with descriptive statistics on divorce, health, and health insurance. To best see the correlations, we run a logit regression of an indicator equal to one if the person is currently divorced and single on health interacted with health insurance, age, race, education, and year dummies. Health insurance is measured at the time of interview rather than at the time of divorce, and we do not know how long ago the divorce was. Table 7 shows the predicted probabilities for different groups. We see that bad health is associated with a 11-12pp higher probability of being divorced and single for uninsured individuals compared to those in good health, but only 4pp for those insured.

Clearly these correlations could be generated through multiple channels which we aim to investigate in future research with alternative data sets. Nevertheless, the simple

[4]Chen (2023) use data on individuals aged 60-70 in the HRS.

correlation tells us that bad health and lack of private insurance are strongly associated with having been through a divorce and remained single. Divorce costs are an additional penalty on the unhealthy that have not been accounted for in life-cycle models with health.

Table 7: Predicted probabilities of being divorced/separated and single, ages 20-64, CPS

	Women	Men
Not Covered by PHI × Good Health	0.276	0.253
	(0.001)	(0.002)
Not Covered by PHI × Bad Health	0.395	0.367
	(0.002)	(0.003)
Covered by PHI × Good Health	0.160	0.130
	(0.001)	(0.001)
Covered by PHI × Bad Health	0.196	0.171
	(0.002)	(0.002)
Observations	1072506	935966

Standard errors in parentheses

Notes: Predictions calculated at the means of all other variables (age, education, race and year). We find the coefficients on health do not vary with race, so we do not run separate regressions. We exclude individuals "never married" from this regression. Individuals previously divorced and re-married are classified as married if they are married at the time of the interview.

4.4 Assortative Mating and Health

We now study the correlations between own health and spousal health. Table 8 shows the fractions of spouses in bad health, by own health, race, and sex. Among healthy Whites, the frequency of bad health among spouses is only 7-8%. However, for unhealthy Whites, 40-42% of spouses are in bad health. (Approximately 12% of married Whites are in bad health in total.) We see similar patterns for the other race groups. Unhealthy married Black women have unhealhty spouses 52% of the time.

These patterns suggest that not only are unhealthy individuals less likely to be married, but when they do marry, they are very likely to have unhealthy spouses. Of course, this relationship could be explained by age, education and other characteristics that are correlated with both spouse's healths.

To take these into account, Table 9 shows results from a logit regression of spousal health (0=good, 1=bad) on own health, conditional on gender, age, spousal age, education, spousal education, and year. The predicted probabilities from these regression are

presented in Table 10. Comparing this with table 8, we see that the main patterns are preserved.[5] We do not see a gender asymmetry. Blacks and Hispanics are more likely to have unhealthy spouses than Whites generally, but the racial differences are especially large among those in bad health.

We also run the same regression controlling for health insurance and allowing it to interact with own health. Table 11 presents the estimated probabilities by health insurance. As we would expect, uninsured individuals are more likely to have unhealthy spouses conditional on everything than the insured. Even among the insured sample, there is a high probability the spouse is unhealthy if own health is bad. However, the uninsured have particularly high rates of unhealthy spouses.

Table 8: Fraction of spouses in bad health, married individuals aged 20-64, CPS

	sex	
	male	female
White		
Health		
Good Health	0.074	0.083
Bad Health	0.400	0.421
Total	0.111	0.122
Black		
Health		
Good Health	0.097	0.117
Bad Health	0.471	0.515
Total	0.161	0.185
Hispanic		
Health		
Good Health	0.080	0.081
Bad Health	0.484	0.482
Total	0.131	0.134

[5]The probability the spouse is unhealthy given own health is bad is lower in Table 10 than in table 8 since age and education account for some of the correlation.

Table 9: Logit regression of spousal health (1=bad), married individuals aged 20-64, CPS

	White	Black	Hispanic
Bad Health	1.760***	1.774***	2.123***
	(0.009)	(0.022)	(0.017)
female	-0.085***	-0.016	-0.173***
	(0.009)	(0.022)	(0.017)
Age (own and spouse)	Yes	Yes	Yes
Education (own and spouse)	Yes	Yes	Yes
Years	Yes	Yes	Yes
Observations	1159228	112336	246396

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Predicted probabilities from logit regression of spousal health (1=bad), married individuals aged 20-64, CPS

	White	Black	Hispanic
male × Good Health	0.072***	0.099***	0.080***
	(0.000)	(0.002)	(0.001)
male × Bad Health	0.310***	0.394***	0.422***
	(0.002)	(0.005)	(0.004)
female × Good Health	0.066***	0.098***	0.068***
	(0.000)	(0.002)	(0.001)
female × Bad Health	0.292***	0.390***	0.380***
	(0.002)	(0.005)	(0.004)
Observations	1159229	112336	246397

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Predictions calculated at the means of all other variables (i.e., age, age of spouse, education, education of spouse, sex, and year).

Table 11: Predicted probabilities from logit regression of spousal health, married individuals aged 20-64, CPS

	White	Black	Hispanic
Not Covered by PHI × Good Health	0.113***	0.142***	0.085***
	(0.001)	(0.003)	(0.001)
Not Covered by PHI × Bad Health	0.404***	0.448***	0.444***
	(0.003)	(0.007)	(0.005)
Covered by PHI × Good Health	0.063***	0.088***	0.067***
	(0.000)	(0.001)	(0.001)
Covered by PHI × Bad Health	0.259***	0.355***	0.354***
	(0.002)	(0.006)	(0.005)
Observations	1159229	112336	246397

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Predictions calculated at the means of all other variables (i.e., age, age of spouse, education, education of spouse, sex, and year).

4.5 The Affordable Care Act (ACA) and Marriage/Divorce

Health insurance protects household resources in the face of health shocks, so an expansion of health insurance could potentially affect the relationship between health and family formation/dissolution as well as assortative mating patterns. To begin exploring the issue, we present some preliminary results on marriage patterns before and after the Affordable Care Act (ACA) which came into effect mainly in 2014. Research in this area could shed light on costs and benefits of insurance reform that have not been previously considered. For example, if the ACA led to more marriages between healthy and unhealthy individuals, its cost might be lower because the extra intra-household risk sharing that arises would partly substitute the need for other health and social insurance programs: a healthy spouse might help prevent the unhealthy individual from reaching a point of reliance on means-tested transfers like Medicaid and welfare. On the other hand, the ACA might have reduced "marriage lock" leading to more divorce.

We construct a dummy equal to 1 if the year is 2014 or after, and zero otherwise. Table 12 shows that the time period after the ACA is associated with lower marital rates, for both young (ages 20-39) and old (40-64) individuals. For the young, the marriage gap between healthy-unhealthy individuals decreased, while for the old it increased. The probability of being divorced increased with the ACA only for those in bad health.

These correlations are consistent with the hypothesis that the ACA reduced "marriage lock" and therefore increased divorce, and lowered marital rates especially for old unhealthy people. (Since unhealthy people are often married with other unhealthy people, this might be why we do not see an increase in divorce for healthy people, or maybe because healthy people are quick to re-marry.)

Table 13 also shows that after the ACA, there is less assortative mating based on health. The coefficient on bad health interacted with the post-ACA time period is negative. Health insurance could lower the penalty associated with bad health in the marriage market. However, we aim to explore other possible explanations in the future, taking into account equilibrium effects.

Table 12: Logit of being married and "divorced and single," CPS

	Mar (young)	Mar (old)	Divorced (all)
Bad Health	-0.724***	-0.714***	0.590***
	(0.015)	(0.008)	(0.009)
ACA=1	-0.290***	-0.089***	-0.030***
	(0.006)	(0.006)	(0.006)
Bad Health × ACA=1	0.082***	-0.099***	0.091***
	(0.021)	(0.012)	(0.013)
age	0.159***	0.008***	0.012***
	(0.001)	(0.000)	(0.000)
Education	Yes	Yes	Yes
Sex	Yes	Yes	Yes
Race	Yes	Yes	Yes
Observations	923785	1111452	1562236

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: ACA is a dummy equal to one if year is 2014 or greater.

Table 13: Logit of wife health on husband health, CPS

	Wife H (young)	Wife H (old)
Bad Health	2.478***	1.873***
	(0.037)	(0.018)
ACA=1	0.306***	0.030**
	(0.027)	(0.015)
Bad Health × ACA=1	-0.335***	-0.095***
	(0.056)	(0.027)
Education	Yes	Yes
Race	Yes	Yes
Ages (own and spouse)	Yes	Yes
Observations	189292	376916

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: ACA is a dummy equal to one if year is 2014 or greater.

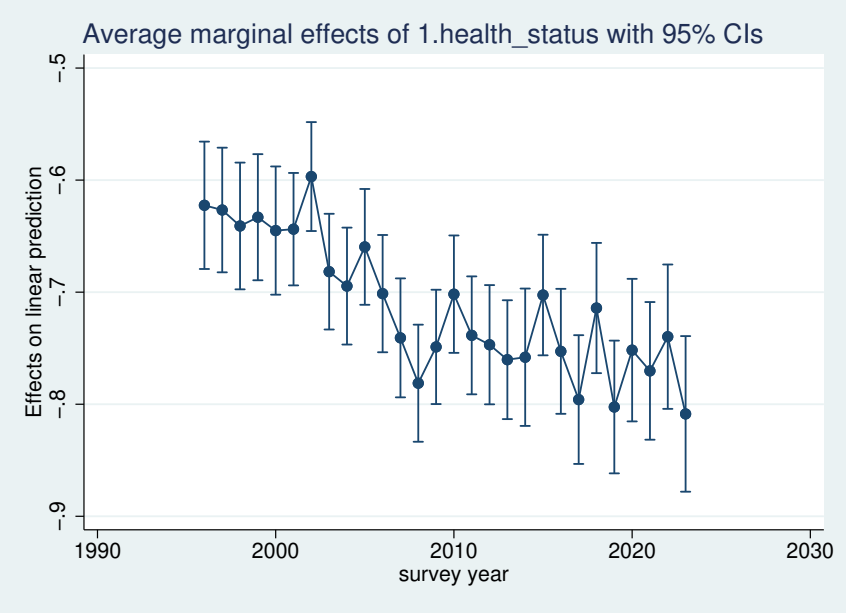
4.6 The Income Penalty of Bad Health over Time

Previous literature has studied how changes in the college wage premium are related to assortative mating and inequality (e.g., Greenwood et al. (2016)). In the same spirit, we investigate the returns to good health in the labor market over time, and whether there is any relationship with assortative mating.

Figure 2 presents the marginal effect of being in bad health vs good health on log total income, controlling for education, quadratic in age, race and sex, and year, and allowing for an interaction between year and health. Bad health was associated with 46% lower income than when in good health in 1996 vs. 55% lower income in 2023. This is a substantial increase in the income penalty of bad health.

In addition to the income penalty, medical prices have increased faster over time than regular consumption prices, further worsening the negative impact of bad health on households' budgets. (The ACA offset this to some extent by reducing overall out-of-pocket costs.)

Figure 2: Average Marginal Effects of Bad Health from log(income) Regression, CPS



Notes: From OLS regression of log income on health, year, health*year, race, age, age squared, education and sex, ages 20-64.

4.7 The Correlation Between Own Health and Spousal Income

We now explore the relationship between own health and the spouse's income. Is good health associated with richer spouses conditional on everything else? Is there evidence of an added worker effect from the spouse to compensate for the other's bad health?

We run OLS regressions of log spousal income on own health, year, year interacted with health, race, education and a quadratic in age, separately by gender. The left panel of Figure 3 shows the average marginal effect of women's bad health on husband's income, and the right hand side panel shows the average marginal effect of men's bad health on the wive's income. First we note that the AME in the left figure is large and negative and increases in absolute value over time. Women in bad health have husbands with lower incomes relative to those in good health, and the gap increases over time.

On the other hand, the right panel shows that for most years, men's health status is not significantly correlated with the wive's incomes. Only in years 2019-2023 we see a negative correlation emerging, but this is much smaller than in the left panel.

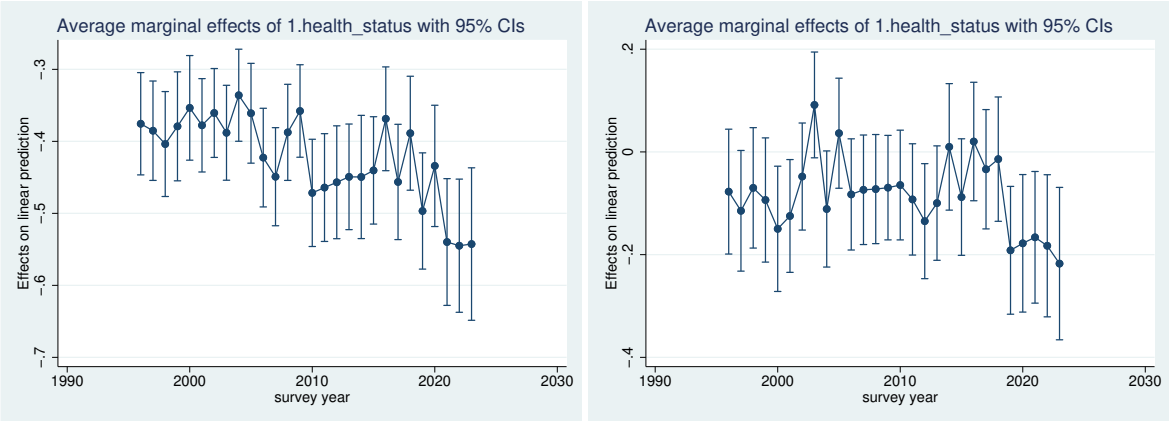
The pattern in Figure 3 is to some extent explained by the fact that unhealthy women marry unhealthy men, and since the income penalty of bad health has increased over

time, these unhealthy husbands are earning less over time relative to the mostly healthy husbands of healthy women.

We dig deeper by repeating the same regressions, but keeping only spouses who are in good health. Figure 4 presents the results. We see that women in bad health still have husbands with lower incomes than good health women, even among the group where all husbands are healthy. And we see this still worsens over time. On the other hand, we see the AME of men's bad health is now mostly positive (right hand side of figure 4), which means that unhealthy men have wives with higher incomes relative to healthy men, in the group where the wives are in good health. There are two likely driving forces here: (1) a selection effect where unhealthy people get matched with lower income spouses, and (2) an added worker effect where the spouse might be working more to compensate for the individual's bad health. For women, the former seems to dominate, whereas for men, the latter seems to dominate.

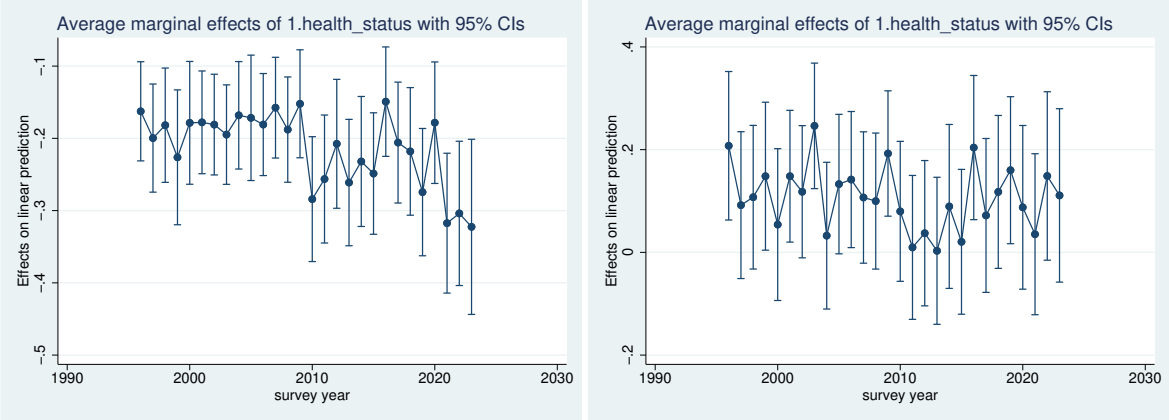
Finally, Figure 5 shows the fraction of spouses in bad health by own total individual income group (income in thousands). We see that low income individuals are most likely to have spouses in bad health, especially males. The fraction of spouses in bad health declines very quickly as own income rises from 0 to 100K, and remains fairly constant at incomes greater than 100K.

Figure 3: Average Marginal Effects of Bad Health, Spouse's log(income) Regression, CPS (Husband income - left, wife income - right)



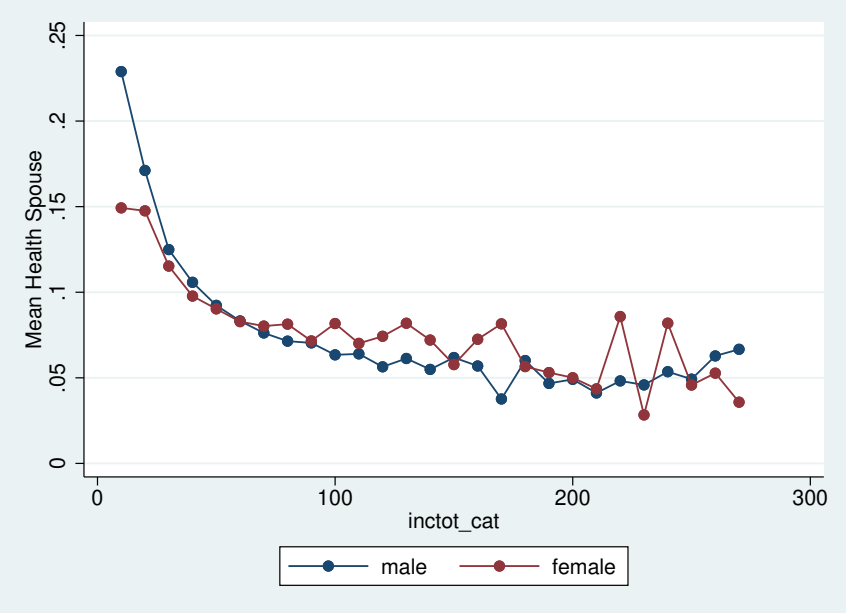
Notes: From OLS regression of log income of husband on health, year, health*year, race, age, age squared, and education, ages 20-64.

Figure 4: Average Marginal Effects of Bad Health, Spouse's log(income) Regression, CPS (Husband income - top, wife income - bottom), keeping only spouses in good health



Notes: From OLS regression of log income of husband on health, year, health*year, race, age, age squared, and education, ages 20-64.

Figure 5: Fraction of spouses in bad health by own income group, CPS



Notes: Ages 20-64 and married.

4.8 Health and Spouse's Education

Another way to look at the penalty of bad health in the marriage market is looking at the probability of marrying down with respect to education. We run a logit regression of marrying down (1=married to someone of strictly lower education than own) on own

health status, a quadratic in age and own education, separately by race and sex. We exclude individuals with high school or less since they cannot marry any further down. Table 14 presents the estimated predicted probabilities from these regressions for Whites aged 25-44. We compare two periods: 1996-97 and 2022-23.

Individuals in bad health are significantly more likely to marry down than those in good health. We see that the average marginal effect of bad health on marrying down is about the same for men and women, and decreased over time. But while the probabilities of marrying down have decreased a lot for men (16pp for unhealthy men), they stayed constant for women. This is likely because the supply of educated women has increased substantially over time. Overall, while unhealthy White men marry less over time, when they do marry, they marry on average higher or equal educated women. Unhealthy women on the other hand still marry down about a third of the time.

Table 14: Predicted probabilities from Logit of "marring down in terms of education," Whites aged 25-44, CPS

	Men (96-97)	Men (22-23)	Women (96-97)	Women (22-23)
Good Health	0.23***	0.13***	0.23***	0.25***
	(0.00)	(0.00)	(0.00)	(0.00)
Bad Health	0.33***	0.17***	0.32***	0.31***
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	16018	11555	17988	12917

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Whites, married, ages 25-44, excludes "less than HS." "Marry down" = 1 if the spouse's education is strictly lower than own education. Logit regression includes own health, age, age sq., and own education.

4.9 Various Health Dimensions: Evidence from MEPS

The MEPS data set has the advantage of containing detailed information on respondents' health and health conditions. However, the sample size is smaller than the CPS, which is a concern especially when studying minorities and restricting to certain characteristics that reduce the sample size (e.g., Black married men in bad health).

We use the MEPS to investigate which dimensions of health are most strongly correlated with marital patterns. We consider BMI, mental health, self-reported health and the number of chronic conditions reported. We acknowledge that these variables are endogenous, with mental health likely being strongly determined by marital status and when married,

the spouse's health status. Our estimates here are meant to simply present descriptive patterns.

We run a logit regression of being married on these health measures, education, age, race, and years. We split the sample into young (ages 20-39) and old (ages 40-64) ages. In terms of the marriage market equilibrium, the gender-specific effects of health conditions on marital status could have different implications depending on a person's age. For older people, the effects might arise from the different supplies of potential partners. For example, due to mortality issues, older men are likely to have a higher number of potential spouses relative to older women. Such an imbalance in the marriage market would not occur in the young people's marriage market.

Table 15 reveals some important gender asymmetries. Higher BMI in men is associated with higher probabilities of being married. BMI is not statistically significant for young women, but is negatively correlated with marriage for old women. A higher number of chronic health conditions is associated with lower marriage for both genders, but the coefficients are about twice as large in absolute value for women compared to men. For both gender, worse mental health is associated with a lower probability of being married, and the effect is stronger for men. Worse self-reported health is positive associated with marriage for young men, but negatively associated for old women.

We also take advantage of the panel dimension in MEPS to explore marital transitions. Table 16 shows results from a logit regression of transitioning from single to married from round 1 of interview to round 5 (approximately 2 years apart), for young men and women. We see again that high BMI in men is associated with higher probabilities of getting married, mental health is associated with lower probabilities, and for women only, the number of chronic health conditions has a negative association. These findings point to the need for a careful construction and interpretation of the health variables in future research looking at health and marriage.

Table 15: Logit Regression of Being Married, MEPS

	(Young Men)	(Old Men)	(Young Women)	(Old Women)
BMI	0.204***	0.201***	-0.002	-0.057***
	(0.016)	(0.015)	(0.014)	(0.013)
Mental Health	-0.298***	-0.252***	-0.210***	-0.189***
	(0.016)	(0.013)	(0.014)	(0.011)
Self-Reported Health	0.049***	0.003	0.018	-0.053***
	(0.017)	(0.014)	(0.014)	(0.013)
Number of Chronic Conditions	-0.084***	-0.072***	-0.205***	-0.139***
	(0.030)	(0.014)	(0.024)	(0.012)
Age	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Race	Yes	Yes	Yes	Yes
Years	Yes	Yes	Yes	Yes
Observations	34921	38864	39761	44597

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Young men (women) indicates people whose ages are between 20 and 39. Old men (women) indicates people whose ages are between 40 and 64. Mental health and self-reported health are standardized and higher numbers indicate worse health. The maximum number of chronic conditions is 7: coronary heart disease, angina, heart attack, emphysema, diabetes, asthma, and arthritis.

Table 16: Logit Regression of Getting Married from Round 1 to Round 5 of Interview, MEPS

	(Young Men)	(Young Women)
BMI	0.158***	0.024
	(0.033)	(0.030)
Mental Health	-0.148***	-0.114***
	(0.032)	(0.029)
Self-Reported Health	0.019	0.015
	(0.031)	(0.029)
Number of Chronic Conditions	-0.078	-0.107**
	(0.063)	(0.052)
Age	Yes	Yes
Education	Yes	Yes
Race	Yes	Yes
Years	Yes	Yes
Observations	18368	20448

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Young men (women) indicates people whose ages are between 20 and 39. Old men (women) indicates people whose ages are between 40 and 64. Mental health and self-reported health are standardized and higher numbers indicate worse health. The maximum number of chronic conditions is 7: coronary heart disease, angina, heart attack, emphysema, diabetes, asthma, and arthritis.

5. Structural Analysis of the Demand for Spousal Health

In this section, we first show that there is a notable difference in the systematic gain to marriage for an individual with good health but low education depending on their gender. Specifically, the gains to marriage for females with low education but good health surpass those of females with high education but poor health. The gain to marriage for males show the opposite pattern. That is, the gains to marriage for males with low education but good health are less than those of males with high education but poor health. We show that this gender asymmetry decreases over time, and has recently disappeared. To understand the driving force behind this change, we build a multi-dimensional matching model where individuals sort based on education and health status. The model allows returns to education to differ by gender and time.

5.1 Changes in the Systematic gain to Marriage

We first explore how the marriage gain to the individual with bad health changes over time. Then, we examine the relative gain to marriage for a (low education - good health) individual compared to a (high education - bad health) individual. For this analysis, we use a bi-dimensional marriage matching function of education and health status, which extends the uni-dimensional marriage matching function in Choo and Siow (2006). The systematic marriage gain is measured by the log of the relative ratio of the number of couples to the number of singles of the local distribution. For males, we let h denote health related characteristics ($h = good, bad$) and e denote education ($e = college, < college$). For females, health and education are denoted as h' and e'. The total systematic gain to marriage of a couple with health characteristics h and h' and educational characteristics e and e' is defined as

$$\pi_{h,h',e,e'} = \ln \Pi_{h,h',e,e'},$$

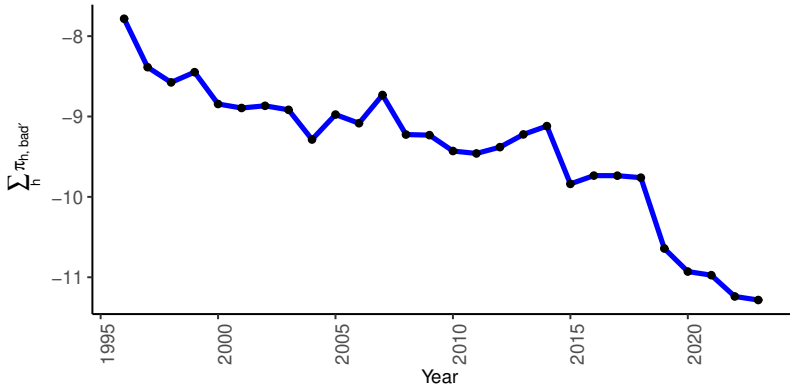
and

$$\Pi_{h,h',e,e'} = \frac{\mu_{h,h',e,e'}}{\sqrt{(\sum_e \sum_h \mu_{h,0,e,0'})(\sum_e \sum_h \mu_{0,h',0,e'})}},$$

where $\mu_{h,h',e,e'}$ is a number of couples which consist of husband and wife with (h,e) and (h',e') health-education pair, respectively.

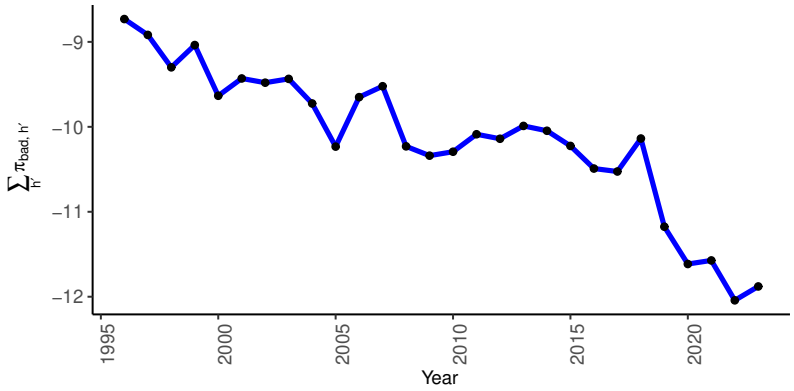
To investigate the impact of bad health on marital transition for an individual, we first compute the systematic gain to marriage for people with bad health across all education levels, for husbands ($\sum_h \pi_{h,bad'}$) and for wives ($\sum_{h'} \pi_{bad,h'}$). Figures 6 and 7 show how the gains changes over time for both husbands and wives, respectively. For both males and females, the systematic gain declines over time. This suggests that the gains to marriage relative to being unmarried have significantly decreased, which is consistent with our earlier findings that unhealthy individuals are more likely to remain unmarried.

Figure 6: Systematic Gain to Marriage for Unhealthy male



Source: CPS data surveyed from 1995 to 2023

Figure 7: Systematic Gain to Marriage for Unhealthy female



Source: CPS data surveyed from 1995 to 2023

Next, motivated by earlier empirical findings suggesting that the effects of health depend on an individual's gender, we investigate how the gains from marriage vary depending on the spouse's health and education. In particular, we consider men and women in good health and with high education, and we compute the relative marriage gain of a spouse with low education and good health compared to the gain of a spouse with high education and bad health. Specifically, the relative gain for females and males are:

$$\rho_{female} = \pi_{good,good',high,low'} - \pi_{good,bad',high,high'};$$
$$\rho_{male} = \pi_{good,good',high,low'} - \pi_{good,bad',high,high'},$$

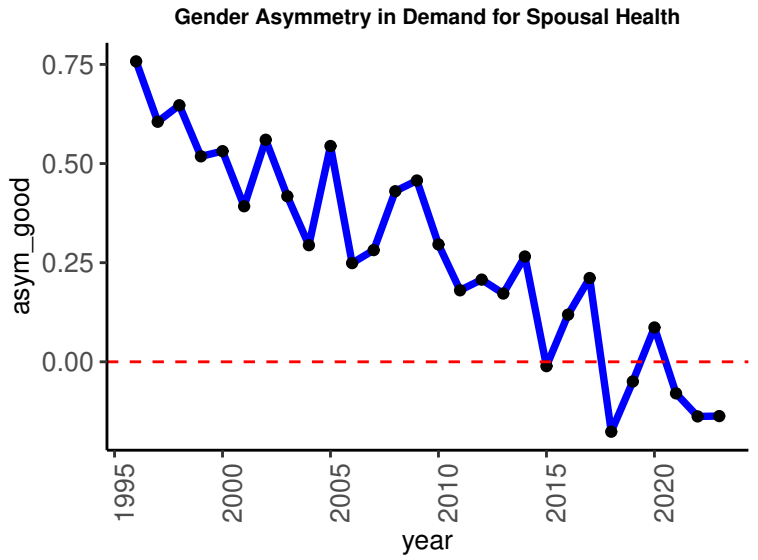
respectively. If the sign of ρ is positive, it suggests the benefits of spousal good health outweigh those of the spouse being highly educated.

Based on our empirical findings in the earlier section, we expect there to be a notable difference in the relative gain between males and females. Figure 8 presents the difference in the relative gains from good health to marriage, namely $\rho_{female} - \rho_{male}$. This figure shows two interesting patterns. First, there is a significant difference in the relative gain, especially before 2000, between females and males. It suggests that female good health is highly valued in the marriage market and outweighs the effects of obtaining a college degree (i.e., being highly educated). For men, the sign of ρ_{male} is the opposite. Second, such gender asymmetry declines over time and disappears after 2021. This suggests that

the gain to marrying individuals with good health and low education has significantly dropped. There are a number of potential channels behind this trend.

First, the significant gender asymmetry observed in the mid-1990s and early 2000s might be attributed to the dominance of health-related concerns over income-related considerations when considering a potential wife. Conversely, income-related considerations could play a crucial role in choosing a potential husband, possibly due to the gender pay gap. Secondly, the shift in the trend could be the result of several factors: (i) a significant increase in female income, which could influence the decision to stay single or choose a husband, and (ii) potential changes in the wife's income contribution to the household in comparison to contributions potentially related to health, such as fertility.

Figure 8: Gender Asymmetry in Spousal Health (Good Health)



Source: CPS data surveyed from 1995 to 2023

5.2 Theoretical Framework

Our aim is to capture the mechanisms underlying the health-related gender asymmetry and its evolution over time. To this end, we build a multidimensional matching model where individuals match based on education, health status, and other observable as well as unobservable characteristics. We specify a transferable utility matching model and let households contribute to the matching surplus in two different ways: household income and health-related public good that is shared within the household. Additionally, we

allow for changes in returns to education and health over time. The following sections provide the initial draft of our model, with plans to incorporate additional features in future versions.

5.2.1 Timeline and Environment

Define $i \in I$ and $j \in J$ as sets of males and females in the marriage market. n the first stage, each person chooses the number of years of education, based on their initial conditions. An individual with a higher education attainment can make a bigger contribution to the joint household income. A higher income leads to the higher marital surplus through increased total consumption of the household. At the same time, it increases the value of remaining single. Thus, increase in returns to education might result in increasing in reservation match value.

In the second stage, people are matched based on the match surplus given the distribution of potential spouses and the equilibrium restrictions.

5.2.2 Surplus function

We specify a transferable utility in marriage surplus function (Choo and Siow, 2006; Adda et al., 2023; Low, 2023). We adhere to the assumptions of Choo and Siow (2006), which include additive and separable shocks of the surplus function, distributed following Type I extreme value.

The marriage surplus Φ_{ij} is a function of household income I_{ij}, health-related public good H_{ij}, a match specific unobserved shock ε_{ij}, and a set of parameters, θ. The marriage surplus for a couple with male i and female j is represented by:

$$\Phi(X_i, Y_j, \theta) = \phi(I_{ij}, H_{ij}, \theta) - \omega_i(X_i) - \omega_i(Y_j) + \varepsilon_{ij},$$

where ϕ is an observable part of the marital surplus, X_i and Y_j are sets of demographic characteristics for male i and female j, respectively, and ω represents the value of remaining single.

The function ϕ is specified as

$$\phi(I_{ij}, H_{ij}) = \alpha_y \ln I_{ij} + \alpha_h \ln H_{ij}.$$

The specification implies that we assume constant returns to scale and neither substitutability nor complementarity between H and I. Income equation is specified as

$$\ln I_{ij} = \gamma_0 + \sum_{k=1}^{K} \{ \underbrace{\gamma_{k,i}^{m} I(degree_i) I(work_i)}_{\text{Husband's income}} + \underbrace{\gamma_{k,j}^{f} I(degree_j) I(work_j)}_{\text{Wife's income}} \},$$

and H_{ij} is a function of husband's health h_i and wife's health h_j. In particular,

$$H_{ij} = g(h_i, h_j, \theta_i^h, \theta_j^h).$$

We let the associated parameters vary by gender in order to allow the husband and wife contributions to H_{ij} to be different.

5.3 Equilibrium

The marriage market equilibrium is equivalent to the outcome of the social planner problem including the option of remaining singles:

$$\max_{\{\alpha_{ij}\}_{i=0,j=0}^{M,F}} \sum \alpha_{ij} \Phi_{ij}$$

subject to

$$\begin{aligned} &\alpha_{ij} = 0, 1, \forall i, j, \\ &\sum_{i=0}^{M} \alpha_{ij} = 1, \forall_j \\ &\sum_{j=0}^{F} \alpha_{ij} = 1, \forall_i \end{aligned}$$

T.B.C.

6. Conclusion

This paper presents new patterns in terms of health and marriage, by race, gender and over time. Overall, given the importance of health for economic outcomes, it is not surprising that health is an important dimension to consider in the marriage market. A key finding is that individuals in bad health are most often single or married to unhealthy partners, thus not benefiting from intra-household insurance from a healthy spouse. Bad health is also associated with lower spousal education (conditional on everything else) and lower spousal income (for women only). Trends over time suggest that the income penalty of bad health has increased. Given these findings, it is crucial to study how the benefits of health insurance are distributed among different groups. A concerning finding is that White single unhealthy men who do increasingly poorly in the marriage market have also seen a decrease in private health insurance over time despite the ACA.

We believe that our findings open an interesting line of research for the future. We are working on building a model that can capture the observed patterns, and expanding our analysis of the importance of health insurance.

In addition, future research could study how inter-generational mobility and child outcomes are related to marital decisions and assortative mating based on health. If unhealthy people marry unhealthy people, or if unhealthy women marry lower income men, or end up single, their children will be more likely to face challenges. It would be fruitful to determine how policy can be used to change such marital patterns.

References

Adda, J., P. Pinotti, and G. Tura (2023). There's More to Marriage than Love: The Effect of Legal Status and Cultural Distance on Intermarriages and Separations. *Unpublished Manuscript*.

Becker, G. S. (1993). *A treatise on the family: Enlarged edition*. Harvard university press.

Blundell, R., L. Pistaferri, and I. Saporta-Eksten (2016, February). Consumption inequality and family labor supply. *American Economic Review 106*(2), 387–435.

Bratti, M. and M. Mendola (2014). Parental health and child schooling. *Journal of health economics 35*, 94–108.

Capatina, E. (2015). Life-cycle effects of health risk. *Journal of Monetary Economics 74*, 67–88.

Capatina, E. and M. Keane (2023). Health shocks, health insurance, human capital, and the dynamics of earnings and health.

Chen, T. (2023). Health insurance coverage and marriage behavior: Is there evidence of marriage lock? *International Studies of Economics 18*(2), 136–158.

Chiappori, P.-A., S. Oreffice, and C. Quintana-Domeque (2012). Fatter attraction: Anthropometric and socioeconomic matching on the marriage market. *Journal of Political Economy 120*(4), 659–695.

Choi, S. and A. Valladares-Esteban (2020). On households and unemployment insurance. *Quantitative Economics 11*(1), 437–469.

Choo, E. and A. Siow (2006). Who marries whom and why. *Journal of political Economy 114*(1), 175–201.

Ciscato, E. (2023). Assessing racial and educational segmentation in large marriage markets. Working paper.

De Nardi, M., E. French, and J. B. Jones (2010). Why do the elderly save? The role of medical expenses. *Journal of Political Economy 118*(1), pp. 39–75.

De Nardi, M., S. Pashchenko, and P. Porapakkarm (2022, October). The lifetime costs of bad health. Working Paper 23963, National Bureau of Economic Research.

Eshaghnia, S. and J. J. Heckman (2023, October). Intergenerational transmission of inequality: Maternal endowments, investments, and birth outcomes. Working Paper 31761, National Bureau of Economic Research.

French, E. (2005). The effects of health, wealth, and wages on labour supply and retirement behaviour. *Review of Economic Studies 72*(2), 395–427.

Greenwood, J., N. Guner, G. Kocharkov, and C. Santos (2016). Technology and the changing family: A unified model of marriage, divorce, educational attainment, and married female labor-force participation. *American Economic Journal: Macroeconomics 8*(1), 1–41.

Guner, N., Y. Kulikova, and J. Llull (2018). Reprint of: Marriage and health: Selection, protection, and assortative mating. *European Economic Review 109*, 162–190.

Lawn, J. E., A. Tinker, S. P. Munjanja, and S. Cousens (2006). Where is maternal and child health now? *The Lancet 368*(9546), 1474–1477.

Low, C. (2023, June). The Human Capital - Reproductive Capital Tradeoff in Marriage Market Matching. *Journal of Political Economy*, 726238.

Ortigueira, S. and N. Siassi (2013). How important is intra-household risk sharing for savings and labor supply? *Journal of Monetary Economics 60*(6), 650–666.

Pencavel, J. (1998). Assortative mating by schooling and the work behavior of wives and husbands. *The American Economic Review 88*(2), 326–329.

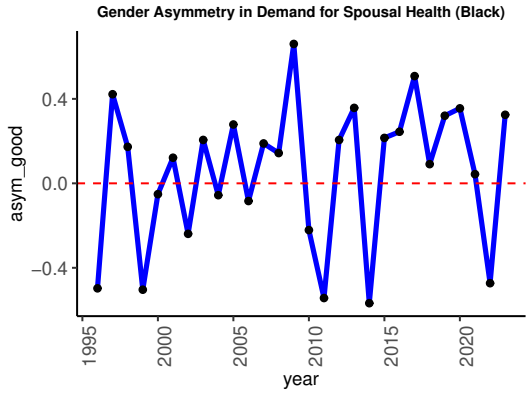
Persson, P. (2020). Social insurance and the marriage market. *Journal of Political Economy 128*(1), 252–300.

A. Appendix

A.1 Gain from marriage for different races

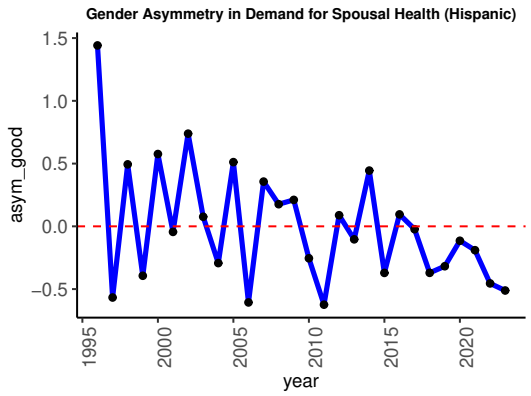
While the figures in the main text showed strong gender asymmetries for Whites, we do not observe these for Blacks and Hispanics. This is consistent with out descriptive patterns where we saw it was mainly Whites that experienced the most pronounced changes over time in marriage patterns.

Figure A.1: Gender Asymmetry in Spousal Health (black)



Source: CPS data surveyed from 1995 to 2023

Figure A.2: Gender Asymmetry in Spousal Health (Hispanic)



Source: CPS data surveyed from 1995 to 2023