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HOW DOES INCREASED LONGEVITY FOR MEN AFFECT WELL-BEING FOR THEIR WIVES IN OLD AGE?

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Abstract

The marked increase in male longevity and the shrinking gap in male-female life expectancy in recent decades should improve the financial outcomes of older women, but this improvement may be dampened if the growth in medical spending and the incidence of disability translates to living husbands burdening the family's budget. Using the *Health and Retirement Study* and an endogenous switching model to account for non-random selection into widowhood, we find that widows are worse off than non-widows, and that women whose husbands die young have worse financial outcomes. But his survival, if accompanied by ill health, hurts women's financial well-being substantially: women married to men in poor health or with limitations in their daily activities have lower income and are more likely to fall below the poverty line, especially while the husband is still alive. We also find that high end-of-life health care costs deplete the wealth that the husband leaves his widow. Finally, we find that being poor in the past is more closely correlated with financial outcomes for married women than it is for widows, suggesting that widowhood may actually break the poverty cycle for some women. The results emphasize the importance of policies like Social Security survivor benefits and Medicaid but also suggest that older couples may need further help to better manage an aging husband's care needs.

Introduction

Several demographic trends have converged to reduce the probability that a married woman becomes a widow and to shorten the duration of her widowhood. Although male life expectancy continues to lag women, it has increased at a faster rate, narrowing the longevity gap between the genders: the male-female longevity gap at age 65 declined from 4.4 years in 1980 to 2.4 years in 2010 and is projected to be even smaller for later cohorts (Board of Trustees, 2011). In addition, the age difference between spouses has shrunk: in the 1900 cohort, husbands were 4.5 years older than their wives on average; by 1950, the age gap was 2.5 years (Lakdawalla and Schoeni 2003). All told, a 50-year-old woman born in 1900 and married to a man born the same year will have a 70 percent chance of outliving her husband; that same woman born in 1950 would have a 62 percent change of outliving her husband.[1]

Of all the factors associated with poverty in old age, the most predictive is widowhood. The share of widows in poverty, at 18 percent, is about four times higher than that of married women age 65 and older (Social Security Administration, 2004). A rich volume of literature (e.g., Hurd and Wise 1989, Myers et al. 1987, Wu 2009) acknowledges that if women could stay married longer, the risk of poverty for older women would be reduced. The implication is that a declining male-female mortality gap may shorten the years of widowhood and, consequently, increase women's retirement resources and reduce their risk of poverty. But less is known about how changes in the health and mortality of older men have impacted the well-being of their wives in old age. If life expectancy gains are associated with additional years of health, then the survival of the husband is unambiguously good for the wife's financial well-being. If, on the other hand, his survival merely prolongs the period of time his medical bills are draining the family's bank account, the wife is not necessarily better off – and may, in fact, end up more likely to fall into poverty than if he had died younger, more quickly and inexpensively.

Using the *Health and Retirement Study* (HRS) and an endogenous switching model to account for non-random selection into widowhood, this project examines the relationship between the characteristics of a husband and his wife's financial well-being before and after his death. The primary cause of poverty in widowhood is losing the income the husband brings in to the marriage. This study examines additional sources of poverty: the expense and effort to care

[1] These calculations are based on the Social Security actuarial life tables, and assume that the couple marries at age 20.

for the husband before his death. Caring for a sick husband may reduce wives' opportunity to work, limiting her earnings and the accrual of retirement income. The burden of out-of-pocket medical spending – though not reflected directly in the poverty measure, because poverty is based on gross income, rather than disposable income – will also reduce the wealth available to support the wife's consumption.

This study contributes to the literature in several ways. First, we are among the first to examine how the husband's final years affect his wife's financial well-being. To our knowledge, only one previous study has examined the relationship between the husband's health before his death and the probability the widow falls into poverty. McGarry and Schoeni (2005) show that the average household spends 30 percent of its income on out-of-pocket medical expenditures near the end of one spouse's life, with lower-income households spending an average of 70 percent. Despite this imposing burden, poverty rates for widows would only be about 10 percent lower if this money spent on health care was accessible to the widow(er) after the spouse's death.[2] Our study builds on McGarry and Schoeni's work by including other measures of the direct and indirect burden the husband places on the couple's finances before his death and by adding additional years of data.

This study also contributes to the growing literature on the degree to which gains in life expectancy have been accompanied by gains in *healthy* life expectancy. The evidence is somewhat mixed, but most studies find that healthy life expectancy has increased with longevity, just at a slower pace.[3] For husbands, any discrepancy between longevity and healthy longevity can result in: 1) increasing the duration of disease before death (e.g., battling cancer for five years instead of one); 2) changing the disease mix (e.g., substituting sudden death from a heart attack with a prolonged decline from cancer). If husbands who live longer spend more time in

[2] McGarry and Schoeni (2005) report that 17.6 percent of women and men widowed between waves 1 and 2 of the HRS are below the poverty line in Wave 2. Adding in the amortized out-of-pocket medical expenditures spent on the deceased reduces the poverty rate to 15.9 percent.

[3] Crimmins et al. (2009) find that disability-free life expectancy grew at the same pace as overall life expectancy from 1984 to 2000. Cai and Lubitz (2007) report similar results from 1992 to 2003. Munnell et al. (2008) find that between 1970 and 2000, while life expectancy at age 50 increased by 4.2 years, disability-free life expectancy increased by only 2.7 years, with significant variation by race and education. Cutler, Ghosh, and Landrum (2013) find that disability-free life expectancy has increased, but find no similar change in disease-free life expectancy. Crimmins and Beltran-Sanchez (2011) echo the latter result, and also find no increase in the duration without mobility functioning loss.

poor health with substantial medical expenses,[4] their increased longevity may actually raise the risk of poverty for couples and worsen the material standing of widows. To account for the difference between life expectancy and healthy life expectancy, we include additional controls that capture the degree to which a wife's well-being depends on the quality of the husband's life in the years prior to death and the nature of his death.

Moreover, widows are more likely to fall into poverty because of selection effects: poor men are more likely to die at any given age (Holden, Burkhauser, and Myers 1986; Weir, Willis, and Sevak 2003). The selection effect has likely grown stronger over time, given that gains in life expectancy have been concentrated among those with higher income and greater educational attainment (Meara, Richards, and Cutler 2008). To account for the systematic differences between widows and non-widows, the study adopts an endogenous switching model (Roy 1951).

Consistent with the existing literature, we find that widows are more likely than married women to fall into poverty or near-poverty and have lower income, and a shorter duration of widowhood is likely better, as women whose husbands die young have worse financial outcomes. But the results also indicate that ailing husbands substantially drain household resources. Women are more likely to fall into poverty and have lower income and wealth if their husbands were or are in poor health or have limitations in their daily activities. This is especially the case among women not observed becoming widows, either because their husbands were still surviving in the latest HRS wave (2010) or the wife died first, suggesting that extra years caring for an ailing husband burden a couple's finances. We also find that being poor in the past is more closely correlated with financial outcomes for married women than it is for widows, suggesting that widowhood in some cases may actually break the poverty cycle for women. This project helps underline the challenges older women face in the midst of changing demographics. Our results provide evidence of how the improvement from gains in male life expectancy in wives' financial well-being may be dampened when their longer-living husband is in poor health. As medical spending and informal care efforts burden the family's financial and non-financial well-being, this study sheds light on how policies like Social Security retirement benefits and Medicaid can help older households.

[4] Over this time, medical expenditures have grown considerably faster than inflation (Smith, Newhouse, and Freeland 2009).

Data and Methodology

This project uses the 1992 through 2010 waves of the HRS to measure the relationship between older women's poverty incidence and the health and mortality of their husbands. The HRS is a nationally representative panel study of older Americans age 50 and older, with interviews every two years beginning in 1992.

The sample includes women who are observed being married at any point during one HRS wave.[5] Table 1 details the criteria for selecting the samples for the two main groups of interest: widows and non-widows. Of the 9,675 women who are part of intact couples, 2,707 are widowed while sampled by HRS, with 1,563 women included in the sample after excluding women missing the wave in which they were widowed, women with limited information on their husbands, women who were younger than 50 in the first wave, and women with zero sampling weights. Nearly 5,000 women who do not lose a husband are included in the non-widow sample after passing similar criteria.

The outcome variables are five measures of the financial well-being for an older woman, differing slightly by whether she becomes a widow in our sample. For widows, we examine only the waves where she is newly or already widowed; for non-widows, we consider all waves. The first two outcomes are indicators for (1) whether her income (plus the income of her husband, if he is still living) ever falls below the federal poverty line or (2) ever falls below 200 percent of the poverty line. The third, fourth, and fifth outcomes, respectively, are the average of her (or the couple's, if he's still alive) income-to-poverty ratio, the natural log of her equivalence-scale-adjusted wealth over these same waves, and the level of financial wealth.[6]

As the previous literature makes clear, widows and married women have very different financial outcomes. One big concern is selection: widows are not randomly selected among women of a particular age; McGarry and Schoeni (2005) attribute 44 percent of the difference in poverty rates between widows and non-widows to pre-widowhood characteristics. A second

[5] The number of widows and non-widows in the first row of each panel of Table 1 does not add up to the total number of married women in the HRS because the husbands of some of the women marked as married are not in the survey, so 136 women are excluded from the analysis.

[6] We use the Census poverty threshold for a household of one person for widows and two people for married couples; income earned by other household members is disregarded. The wealth outcome variable is the couple's or widow's net worth, adjusted for the equivalence scale (Citro and Micheal 1995) to account for different household sizes: (Net worth)/(Number of Adults + number of children*.7). Financial wealth is the net worth excluding housing equity, vehicles, business assets, and debt from mortgages and other home loans, adjusted for the equivalence scale.

concern is that the relationship between husbands' or wives' characteristics and older women's financial outcomes may differ between the two groups. For example, out-of-pocket medical spending may affect women more negatively if their husbands are still alive – continuing to burden the household with expensive care – than if he has already passed on.

To account for the selection into widowhood, and to allow coefficient estimates to differ between widows and non-widows, the regression analysis estimates an endogenous switching model (Roy 1951). Although HRS is a panel, our preferred specification includes only one observation per person, and both the wife's selection into widowhood and her eventual financial well-being use the values of independent variables from the first wave in the sample (or their first wave as a married couple, if marriages happen later in life). We also present the results of an alternative specification which uses each person-wave, with more contemporaneous values of the control variables. The concern with the person-wave observations is that using more contemporaneous controls makes the relationship between these controls and the outcomes endogenous. That is, we would like to say that the husband being in poor health in the most recent wave reduces the wife's well-being, but the couples' well-being may also make his health poorer (i.e., reverse causality), or couples who are at greater risk of poor financial outcomes may also be more likely to have a deceased husband or a husband with declining health (i.e., selection). Using values of control variables that are several waves removed from the outcome variable, and controlling for selection into widowhood using these variables, likely reduces the influence of endogeneity.

The first step in the endogenous switching model is to estimate a probit selection regression, where the outcome variable is whether woman *i* married to man *j* is ever observed being widowed:

$$Widow_{ij} = \alpha_1 Age_j + \delta_1 Z_j + \gamma_1 X_i + \varepsilon_{1i} = \Omega Q_{ij} \quad (1)$$

Because the sample includes both living and deceased husbands, the husband's characteristics, *Z*, are taken from his first HRS wave (or the first wave of the marriage, for those marrying late in life). These characteristics include his age, educational attainment, an indicator for whether he's working, indicators for classifying himself as being in fair or poor health or reporting limitations in the Activities of Daily Living (ADL) module, the natural logarithm of his total out-of-pocket

medical expenditure over the two years prior to the first interview, and indicators for his HRS cohort.[7] In addition, we control for the wife's characteristics in vector *X*, including her age, race, educational attainment and, to capture the persistence of poverty, whether she is below the poverty line in her first wave in the sample; because we are already controlling for the husband's age, the coefficient on the wife's age captures the relationship between the couple's age difference and the probability that he dies in sample.[8]

After estimating equation (1), we next calculate the Inverse Mills Ratio (IMR):

$$IMR = \frac{\phi(\widehat{\Omega}Q_{ij})}{\Phi(\widehat{\Omega}Q_{ij})}$$

where ϕ and Φ are the standard normal probability density function and cumulative distribution function, respectively. IMR is then included in the outcome equations (2) and (3), as in a Heckman two-step model (Cameron and Trivedi 2005).[9]

Finally, we estimate the relationship between the husband's characteristics and the financial well-being measures separately by whether the wife is ever observed as a widow during her time in the sample. For widows, we estimate:

$$Y_{ij} \big| \left(Widow_{ij} = 1\right) = \beta_2 Death_j + \delta_2 Z_j + \gamma_2 X_i + \sigma_{12} IMR + \varepsilon_{2i} \quad (2)$$

Our primary focus is on the estimated marginal effects of each variable in the *Death* vector. This vector includes several variables collected by HRS as part of the exit interview when the

[7] The cohort controls account for both secular trends in unobserved characteristics and, importantly, the duration in the sample. The latter factor is a concern because husbands in the HRS cohort (born 1931-1941) are observed for longer than women in the Children of the Depression (CODA) cohort that is slightly older than them (1924-1930). The longer duration makes HRS husbands appear to be more likely to die in-sample than CODA husbands, but cohort dummies should account for the difference in duration.

[8] Given that wife's age is effectively controlling for the couple's age gap, the sign of its marginal effect is ambiguous. Imagine two women married to 70-year-old men: wife A is 70, while wife B is 55. On the one hand, we may be less likely to observe A as a widow because A has a higher probability of dying first, which removes her from the sample; in that event, the marginal effect on wife's age would be negative. On the other hand, the fact that B's husband was able to attract a younger woman may indicate that he is healthier and of higher status in unobserved ways, making him less likely to die; in that event, the marginal effect on wife's age would be positive.

[9] The coefficient on IMR in equation 2 estimates the covariance between ε_{1it} and ε_{2it}. Similarly, the coefficient on IMR in equation 3 estimates the negative of the covariance between ε_{1it} and ε_{3it} (Cameron and Trivedi 2005). In most specifications, the IMR is statistically significant or close to it, justifying the Roy Model specification.

husband is first reported to be deceased: the age at which the husband died, an indicator for whether the widow reports the death as expected, and a categorical variable for the amount of time between the start of his final illness and his death (between one month and one year, and greater than one year, with less than one month as the omitted condition). For widows, the *X* vector includes an indicator for whether the woman was ever below the poverty line before widowhood.

We also include two measures of the out-of-pocket burden of his medical expenditures: his imputed total spending in the last six months of his life based on the exit interview,[10] and a weighted average of his monthly medical spending reported at the last two HRS interviews in which he was alive.[11] We expect that out-of-pocket medical expenditures should have a small correlation with poverty, near-poverty, and income-to-poverty. These outcomes are based on gross income, rather than income net of medical expenses, so any correlation will be due to medical spending as a proxy for care needs that prevent either spouse from earning or accruing additional retirement benefits. Wealth and financial wealth, on the other hand, should be negatively correlated with out-of-pocket medical expenditures, as greater spending taps into wealth that can be used to support consumption at older ages.[12]

For non-widows, we estimate:

$$Y_{ij} \big| \left(Widow_{ij} = 0\right) = \delta_3 Z_j + \gamma_3 X_i - \sigma_{13} IMR + \varepsilon_{3i} \tag{3}$$

For both equations (2) and (3), the vectors *Z* and *X* are almost the same as in equation (1). Because the dependent variable in the poverty regressions is binary, we estimate probit

[10] The time between the last living interview and death can vary from one month to more than 24 months, but the literature emphasizes that spending only ramps up in the last 4 to 6 months of life (Yang, Norton, and Stearns 2003). To impute spending during only the last six months, we regress exit file out-of-pocket medical spending on health care spending in each of the last two living interviews, dummies for the number of months between the last living interview and the husband's death, health insurance coverage, income quintiles, race, education, work status, and wave dummies. We then use these estimates to predict spending if every husband died six months after his last interview.

[11] Let s_{t-1} equal average monthly spending in the most recent wave, and s_{t-2} equal average monthly spending two waves ago. Those two waves are separated by *M* months (usually around 24 months), and the husband died *m* months after the most recent interview. His average monthly medical spending two years before his death is:

$$\left(1 - {}^{m}/_{M}\right)s_{t-2} + \left({}^{m}/_{M}\right)s_{t-1}$$

[12] Fewer than 10 percent of households annuitize their wealth non-automatically, i.e. except through Social Security and defined benefit pensions (Johnson, Burman, and Kobes 2004), so depleting wealth likely does not affect income directly.

regressions, and report the marginal effect (i.e., the mean derivative), with bootstrapped standard errors. When the outcome variable is the income-to-poverty ratio or log wealth, the model is estimated using ordinary least squares.

Results

Table 2 compares the characteristics of those who are ever widows with those who are never widows when first observed as part of a married couple, with widows separated by whether their husbands died slowly or quickly. For the summary statistics table, we define a death as "slow" if the husband required help with at least one ADL in both of his last two interviews (living or exit) or if the wife reports that the time between the start of his final illness and death was at least one month; the remainder of deaths are classified as "quick." The asterisks in Table 2 represent the statistical significance of the differences between quick and slow deaths (middle column), and between widows and non-widows (far right column).

Women whose husbands are observed dying during the HRS sampling window enter the HRS at an older age, not surprisingly. Their racial composition and the share of them who are of Hispanic origin are similar to those whose husbands remain alive at the end of their sampling window, except that widows are less likely to be a race other than white or black. Greater education is associated with a lower probability of losing one's husband: 24 percent of widows did not complete high school, compared to only 16 percent of women whose marriages remained intact, and 47 percent of non-widows went to college compared to only 32 percent of widows.[13] Widows were more likely by a statistically significant, albeit small, margin to already be in poverty in the first wave. The gap in the proportion below 200 percent of the poverty line was more substantial: 24 percent of widows were near-poor at the start of the sample, compared to only 12 percent of non-widows. Eventual widows start out with far lower average income (relative to the poverty line) and tend to be lower in the income, total wealth, and financial wealth distributions than those who remain part of intact couples throughout the sample.

By most measures, women whose husbands die slowly do not differ significantly from women whose husbands die quickly. The lone statistically significant comparison of

[13] The relationship between education and widowhood is complicated somewhat by the fact that widows are older, and thus from generations with less educational attainment.

characteristics in their first wave in sample is in the income distribution: surprisingly, quick-death widows are statistically significantly less likely to be in the middle income quintile than slow-death widows; the top two income quintiles are larger to compensate, but the difference with slow-death widows at the top of the distribution is not statistically significant.

Table 3 reports characteristics for husbands when they are first sampled. Husbands who survive through the 2010 HRS sample are younger, better educated, more likely to be a race other than white or black, more likely to be Hispanic (though this likely reflects a cohort effect), more likely to be working, and less likely to be in fair or poor health or have at least one ADL than husbands who die, though their out-of-pocket medical expenditures are not significantly different. Husbands who eventually die quickly are less likely to report fair or poor health status than those who die slowly, suggesting that slow death often follows a long period of health decline.[14] Husbands who die quickly are also more likely to be working and more likely to be Hispanic and slightly better educated (though this difference is not statistically significant). Although medical expenditures in the first wave are more than 60 percent larger for quick-dying husbands, the difference with slow-dying husbands is not statistically significant.

Table 4 reports the characteristics for widows in the first wave after their husbands die separately for "quick" and "slow" deaths – in essence, previewing the regression results. The post-widowhood differences between women whose husbands died quickly and slowly are clearer than the differences between these two groups at the initial interview (seen in Table 2). Those women whose husbands died quickly are less likely to fall into poverty, and slightly less likely to fall into near-poverty, though only the former difference is statistically significant. Quick-death widows are less likely to fall in the bottom income quintile and are more likely to be in the second-to-highest quintile, both by a statistically significant margin. Quick-death widows are also less likely to fall in the second-to-lowest total wealth quintile than widows whose husbands die slowly, and they more likely to be in the second-to-highest wealth quintile. Interestingly, quick- and slow-dying men spend similar amounts on medical care two years before death, and the difference in their medical spending in the last six months before death is small and statistically significant only at the 10 percent level, so even those classified as dying

[14] We should expect ADLs to be more prevalent in the "slow death" group, as the presence of ADLs helps to define this group. But this need not be the case: husbands could be classified as "quick death" if they did not require help with their ADLs, or if they had the ADL in only one of the last two interview waves (living or exit). Nearly 10 percent have an ADL; while this figure is statistically significantly less than the value for the "slow death" group, it is larger than the non-widow group (around 6 percent).

quickly are likely in poor health because of conditions other than the one that ultimately killed them.

Tables 5 and 6 report the marginal effects and bootstrapped standard errors from the regressions, accounting for selection into widowhood. The first column reports estimates for the switching regression – the relationship between husbands' and wives' characteristics at sample entry and the probability that the woman is observed as a widow during her time in the HRS. Subsequent columns in Table 5 give estimates – for, separately, ever-widowed and for never-widowed – where the outcome variables are indicators for falling into poverty (income below 100 percent of the federal poverty line) or near-poverty (income below 200 percent of the federal poverty line).

The first column of Table 5 (duplicated in the first column of Table 6) indicates that women are more likely to be widows if their husbands are in fair or poor health or are not working in their first wave in the HRS or have less than a high school education, and they are less likely to be widows if their husbands are a race other than white or black. Controlling for the husband's age, older women are less likely to be widowed, suggesting that spouses who are close in age are more likely to be in intact couples. These findings are largely expected, though the marginal effect of the husband's age on widowhood is surprisingly small and statistically insignificant, perhaps due to cohort differences in the duration in-sample.

The results in subsequent columns suggest that a wife's probability of ever falling into poverty or near-poverty has a strong relationship with her husband's health, and we are more likely to reject the null hypothesis of no relationship between poverty and the husband's health with those women whose husbands survive the sampling window. Widows whose late husbands reported at least one ADL in the first wave are 7 percentage points (about 28 percent of the mean poverty rate of 24 percent) more likely to fall into poverty at some point in sample. Women whose living husbands with fair or poor health in the first wave are 2.4 percentage points (or 20 percent of the mean poverty rate of 12 percent) more likely to fall into poverty, and having an ADL is associated with a 4.3 percentage point (or 35 percent of the mean) increase in falling below the poverty line.

Several measures suggest that the continued presence of the husband is a positive, though the magnitudes of the effects are small. Older living husbands are less likely to fall into poverty, though the correlation is small. Widows whose husbands die young are also more likely to fall

into poverty, though the correlation is not large (only about 4 percent of the mean poverty rate). Most other measures of health or the circumstances of his death are statistically insignificant and of small magnitude.

With both widows (the husband's out-of-pocket medical spending two years before his death) and non-widows (the husband's medical spending in his first wave in the sample), the husband's medical expenditures have a small but statistically significant negative correlation with falling into poverty. While we hypothesize that medical expenditure may not directly impact the probability of being below the poverty line, the correlation observed here may be due to the relationship between income and medical expenditures: couples who have lower income when first sampled are also likely to be (or become) eligible for Medicaid, which has low out-of-pocket costs, while higher income individuals choose, or have the ability, to spend more on medical care.[15]

The results for falling into near-poverty are largely similar, though among characteristics of the husband's death, only his age at death is correlated with the widow's outcome. Fair or poor health is also associated with an increase in the probability of the intact couple's income falling below 200 percent of the poverty line, but the correlation with ADLs is now statistically insignificant, and neither relationship holds for widows.

The correlation of poverty outcomes with the husband's other characteristics and with the wife's demographics are largely in the predicted direction. Lower-educated women, especially those married to lower-educated men, are more likely to fall into poverty or near-poverty. Women with black or Hispanic husbands are also more likely to fall into poverty, with no difference between women of the same or different races or ethnicities than their husbands. Surviving husbands who were working in the first wave are less likely to see their wives fall into poverty or near-poverty, but deceased husbands who work when they first appear in the sample have little correlation with the wives' later poverty outcomes. Finally, the last two rows of Table 5 show the persistence of poverty: a wife who enters the sample in poverty, or is in poverty right before widowhood, is far more likely to be below the poverty line at some other point.

[15] We do not control for health insurance coverage, because Medicaid eligibility is almost perfectly collinear with the dependent variable in the poverty and income-to-poverty regressions. A better measure of the burden of the husband's medical spending on the household would abstract from his actual coverage level. For example, we would control for his out-of-pocket spending if he had only Medicare coverage (since most individuals in the sample are over 65) without Medicaid or any private insurance, but this is not possible (except with the HRS linked to the Medicare Current Beneficiary Survey) without more information about total medical spending and event histories about care received.

Surprisingly, perhaps, this correlation is strongest for women whose husbands are still alive, suggesting that widowhood may actually break the poverty cycle for some women, if they can benefit from survivor benefits or just having one less mouth to feed.

The qualitative conclusions are similar when the outcome variables are the average income-to-poverty ratio, log wealth, and financial wealth during a woman's time in-sample (Table 6). Fair or poor health is associated with a lower income-to-poverty ratio and lower financial wealth, though this is statistically significantly only for non-widows in both cases; it is also associated with lower wealth for both widows and non-widows. If the husband has at least one ADL and survives, the couple's wealth and financial wealth are lower by statistically significant margins. As in Table 5, out-of-pocket medical expenditures two years before death (for deceased husbands) or over the most recent two-year period (for living husbands) are both associated with better financial outcomes; this result is surprising for wealth and financial wealth, but likely reflects both that lower-wealth individuals are more likely to qualify for Medicaid and the positive income/medical spending gradient. But as with poverty, total wealth and financial wealth (though not significant) are lower with greater medical expenditures in the last six months of the husband's life, suggesting that high end-of-life health care costs deplete the wealth that the husband leaves his widow. A husband dying at a younger age is associated with a lower income-to-poverty ratio and lower financial wealth, which is consistent with our earlier finding of increased risk of falling into poverty. But we cannot reject the null of no relationship between death age and total wealth, suggesting that housing equity may prop up the wife's net worth. Similar to what we observed for the likelihood of falling poverty, we also find a stronger correlation for wives between initial poverty status and later financial measure than there is for widows, again suggesting that widowhood may actually bring better financial outcomes for some women.

As a robustness check, we also estimate our model at the person-wave level. Tables 7 and 8 report the results. In this case, the switching regression estimates the relationship between entry-time characteristics and the probability of being a widow in any given wave *t*, while the financial well-being regressions are estimated separately for current widows and current non-widows. As with the person-level regressions in Tables 5 and 6, a wife's poverty outcomes are worse when her husband is in fair or poor health in his most recent wave. ADLs are also associated with a higher probability of falling into poverty or near-poverty, but only for women

with living husbands – and not for widows. Similar to the earlier results, larger out-of-pocket medical expenditures in the current wave are associated with a lower probability of poverty or near-poverty for intact couples. But the pre-death medical expenditures variables have an interesting pattern. Expenditures two years before death are negatively correlated with having income below the poverty line, perhaps because of insurance coverage or selection. But spending in the last six months of the husband's life is associated with a higher poverty probability; though this spending does not make poverty more likely directly, expensive end-of-life care may be a sign that neither the husband nor the wife could work near the end of this life. Also, women with husbands who die between one month and one year after being diagnosed with the condition that will eventually prove fatal are more likely to have income below 200 percent of the poverty line.

The results in Table 8 indicate that the husband's fair or poor health and ADLs drag down the income-to-poverty ratio, total wealth, and financial wealth only for women with husbands who survive throughout the sample. Again medical expenditures for living husbands or expenditures two years before the husband's death are associated with better financial outcomes, as is having a husband who dies expectedly. But as with poverty, total wealth and financial wealth are lower with greater medical expenditures in the last six months of the husband's life, suggesting that high end-of-life health care costs deplete the wealth available to support the widow's consumption. Finally, wives have higher income and wealth when their husbands die at older ages.

Conclusions

Dramatic improvements in life expectancy, particularly among men, coupled with a convergence in spouses' ages, have decreased the amount of time that a woman is expected to be widowed. Given that widowhood carries a high risk of falling into poverty or taking a substantial hit to one's income or wealth, the decreased duration of widowhood should be a boon to the well-being of older women. But with medical spending continuing to outpace income growth, and with growing evidence that the incidence of disability and chronic illness has increased, the extension of men's lives into ages when they are likely to require greater formal and informal care can dampen the expected improvement in women's financial outcomes.

This study finds that widows are generally worse off, especially when their husbands die young. But his survival, if accompanied by ill health, often hurts his wife's financial well-being: women are more likely to be poor and have lower income and wealth when their husbands experience worse health or limitations in their daily activities, especially among women whose husbands survive the sample window. In addition, high end-of-life health care costs deplete household wealth.

We emphasize that these results should not be interpreted as causal, as some of the relationships are subject to endogeneity through reverse causality: men reaching older ages with low income are more likely to develop health limitations or be in ill health, which makes poverty for their wives and widows more likely. The endogenous switching model accounts for selection into widowhood, placing on sounder footing the finding that women are not widowed during the sample window are more burdened than widows if their husbands were in fair or poor health or had ADLs. But comparisons within the widow or non-widow categories should be interpreted with caution.

The results emphasize that caring for a sick husband can be a substantial hurdle to efforts to continue working at older ages and accruing retirement benefits, while depleting the wealth available to support late-life consumption. Men living longer is likely to be a positive, since widowhood is still associated with worse financial outcomes, but the husband's survival into his more expensive years can be a mixed blessing. Existing programs have helped ensure the well-being of the healthier spouse regardless of whether the less healthy spouse lives or dies: Medicare and Medicaid have eased the burden of a husband's formal care, and survivor benefits from Social Security and other annuities have provided much-needed income to the widow(er). But policies that provide further help may be needed so that families can better manage an aging spouse's informal care and better address its broader consequences.

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Table 1. *Sample Selection Criteria*

Criterion	
Full HRS sample	30,670
Married women	9,675
Widows	
Widowed in sample	2,707
Not missing wave before widowhood	2,302
Have husband's medical spending 2 wave before Death	2,037
Age 50 or older at sample entry	1,938
Non-zero sampling weight	1,563
Non-Widows	
Not widowed in sample	6,832
Age 50 or older at sample entry	6,038
Non-zero sampling weight	4,869

Source: Health and Retirement Study (1992-2010).

Table 2. *Widows' Characteristics at Sample Entry, by Husband Type of Death*

	All widows	Widows by spousal death type		Non-widows
		Quick	Slow	
Age	65.4	65.7	65.2	58.6***
Race				
White	0.904	0.908	0.901	0.894
Black	0.069	0.064	0.072	0.059
Other	0.027	0.028	0.027	0.047***
Hispanic	0.056	0.066	0.048	0.064
Education				
Less than high school	0.236	0.221	0.247	0.156***
High school	0.440	0.440	0.440	0.377***
Some college	0.324	0.339	0.313	0.467***
Below 100% of poverty	0.051	0.048	0.053	0.038**
Below 200% of poverty	0.244	0.236	0.249	0.124***
Income/poverty	4.413	4.487	4.362	7.304***
Income Quintiles				
Bottom	0.150	0.153	0.148	0.104***
2nd	0.209	0.196	0.219	0.171***
3rd	0.239	0.209**	0.259	0.214**
4th	0.199	0.218	0.185	0.239***
Top	0.204	0.223	0.190	0.272***
Wealth Quintiles				
Bottom	0.113	0.101	0.121	0.099
2nd	0.208	0.192	0.219	0.166***
3rd	0.206	0.210	0.203	0.217
4th	0.246	0.253	0.241	0.237
Top	0.228	0.245	0.216	0.282***
Financial Wealth Quintiles				
1	0.184	0.184	0.184	0.180
2	0.152	0.146	0.156	0.123***
3	0.216	0.218	0.215	0.192**
4	0.212	0.215	0.209	0.237**
5	0.236	0.237	0.235	0.267**
Sample size	1,563	655	908	4,869

Note: The husband died "slowly" if he required help with one or more ADLs in his last two waves and/or spent more than a year between his final illness and death. Non-widows' characteristics are for all waves. The middle column of asterisks tests whether Slow and Quick Death widows are statistically significantly different from each other. The far right column of asterisks tests whether all widows and all non-widows are statistically significantly different from each other.
Source: Health and Retirement Study (1992-2010).

Table 3. *Husbands' Characteristics at Sample Entry, by Death Type*

	All deceased husbands	Husbands by death type		Living husbands
		Quick	Slow	
Panel A: Characteristics at sample entry				
Age	69.6	69.3	69.9	60.5***
Race				
White	0.908	0.913	0.905	0.897
Black	0.071	0.063	0.077	0.065
Other	0.020	0.023	0.018	0.037***
Hispanic	0.043	0.054*	0.036	0.057**
Education				
Less than high school	0.339	0.331	0.345	0.184***
High school	0.297	0.292	0.301	0.316
Some college	0.364	0.378	0.354	0.500***
Working	0.289	0.340***	0.253	0.673***
Fair or poor health	0.373	0.307***	0.419	0.166***
Any ADLs	0.131	0.095***	0.157	0.058***
Medical expenditure	2,800	3,600	2,200	2,400
Sample size	1,519	648	871	4,690

Note: The husband died "slowly" if he required help with one or more ADLs in his last two waves and/or spent more than a year between his final illness and death. Living husbands' characteristics are for all waves. The middle column of asterisks tests whether Slow and Quick Death husbands are statistically significantly different from each other. The far right column of asterisks tests whether deceased and living husbands are statistically significantly different from each other.
Source: Health and Retirement Study (1992-2010).

Table 4. *Widows' and Husbands' Characteristics at Start of Widowhood, by Death Type*

	Quick	Slow
Age	73.4	73.7
Below 100% of poverty	0.111**	0.146
Below 200% of poverty	0.473	0.512
Income/poverty	3.561	4.362
Income Quintiles		
Bottom	0.193**	0.236
2nd	0.235	0.222
3rd	0.179	0.173
4th	0.206**	0.159
Top	0.187	0.211
Wealth Quintiles		
Bottom	0.156	0.170
2nd	0.193**	0.241
3rd	0.194	0.218
4th	0.271***	0.202
Top	0.186	0.169
Financial Wealth Quintiles		
1	0.168	0.180
2	0.176	0.188
3	0.200	0.220
4	0.244	0.231
5	0.211	0.182
Husband's death age	76.3	76.7
Husband's monthly medical expenditures		
Last 6 months	3200*	3500
Last 2 years	230	210
Husband's death was expected	0.375***	0.702
Husband's time to death		
< 1 month		0.120
> 1 month, < 1 Year		0.396
> 1 year		0.484
Sample size	734	1,016

Note: The husband died "slowly" if he required help with one or more ADLs in his last two waves and/or spent more than a year between his final illness and death. The middle column of asterisks tests whether Slow and Quick Death widows are statistically significantly different from each other.
Source: Health and Retirement Study (1992-2010).

Table 5. *Roy Model Regressions of Ever Falling into Poverty and Near-Poverty*

	Probability of being a widow	Below poverty line		Below 200% of poverty line	
		Widows	Non-widows	Widows	Non-widows
Mean outcome	0.197	0.236	0.123	0.646	0.323
Husband variables					
Medical expenditure last 6 months before death		0.013		-0.004	
		(0.009)		(0.012)	
Average monthly medical expenditure 2 years before death		-0.012*		-0.011	
		(0.007)		(0.008)	
Death was expected		-0.026		0.006	
		(0.025)		(0.026)	
Time to death was less than a year but more than a month		0.037		-0.002	
		(0.029)		(0.031)	
Time to death was over a year		0.042		-0.0005	
		(0.031)		(0.027)	
Death age		-0.009***		-0.006**	
		(0.003)		(0.003)	
Age	0.0003		-0.004***		-0.005**
	(0.001)		(0.001)		(0.002)
Fair or poor health	0.130***	-0.016	0.024*	0.006	0.072***
	(0.015)	(0.022)	(0.015)	(0.023)	(0.023)
ADLs	0.029	0.066*	0.043*	-0.030	0.054
	(0.020)	(0.035)	(0.026)	(0.048)	(0.035)
Medical expenditure	0.001		-0.004**		-0.010***
	(0.002)		(0.002)		(0.003)
Race					
Black	-0.018	0.135***	0.082***	0.074*	0.113***
	(0.017)	(0.046)	(0.020)	(0.044)	(0.025)
Other	-0.071**	-0.109	0.038	-0.023	0.028
	(0.032)	(0.078)	(0.027)	(0.104)	(0.045)
Hispanic	0.007	0.226***	0.114***	0.030	0.156***
	(0.024)	(0.068)	(0.028)	(0.074)	(0.037)
Education					
				**	
Less than HS	0.026*	0.116***	0.039***	0.138*	0.089***
	(0.015)	(0.035)	(0.014)	(0.033)	(0.024)
Some college	0.014	0.017	-0.013	-0.054*	-0.078***
	(0.013)	(0.030)	(0.012)	(0.031)	(0.019)
Working	-0.105***	0.013	-0.039***	-0.018	-0.112***
	(0.014)	(0.030)	(0.014)	(0.033)	(0.019)

Table 5. *Roy Model Regressions of Ever Falling into Poverty and Near-Poverty* (cont'd)

	Probability of being a widow	Below poverty line		Below 200% of poverty line	
		Widows	Non-widows	Widows	Non-widows
Wife variables					
Age	-0.005***	0.002	-0.004***	0.004*	-0.004**
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Race					
Cross-race couple	0.062	0.087	0.031	0.018	0.068
	(0.045)	(0.092)	(0.028)	(0.106)	(0.045)
Cross-Hispanic couple	-0.004	-0.030	-0.027	-0.043	-0.084*
	(0.032)	(0.074)	(0.027)	(0.084)	(0.050)
Education					
Less than high school	-0.027*	0.105***	0.064***	0.154***	0.122***
	(0.015)	(0.031)	(0.016)	(0.032)	(0.024)
Some college	-0.020	-0.054**	-0.002	-0.139***	-0.048***
	(0.013)	(0.025)	(0.011)	(0.031)	(0.017)
In poverty at entry wave	-0.006		0.818***		0.602***
	(0.023)		(0.028)		(0.106)
In poverty before widowhood		0.173***		0.135***	
		(0.047)		(0.037)	
N	6,432	1,563	4,869	1,563	4,869

Note: Regressions include cohort dummies and, except for first column, the Inverse Mills Ratio from the selection regression.
Source: Authors' estimates from *Health and Retirement Study* (1992-2010).

Table 6. *Roy Model Regressions of Average Income/Poverty, Wealth, and Financial Wealth*

	Income/poverty		Log wealth		Financial wealth (linear)	
	Widows	Non-widows	Widows	Non-widows	Widows	Non-widows
Mean outcome	3.730	6.258	355,900	392,000	154,800	154,500
Husband variables						
Medical expenditure last 6 months before death	0.061		-0.162***		-3665.6	
	(0.090)		(0.057)		(3689.3)	
Average monthly medical expenditure 2 years before death	0.207**		0.095**		9020.9***	
	(0.096)		(0.045)		(2892.3)	
Death was expected	-0.478		0.133		-2091.4	
	(0.506)		(0.142)		(16027.3)	
Time to death was less than a year but more than a month	-0.026		-0.254		24340.7	
	(0.520)		(0.185)		(17658.3)	
Time to death was over a year	0.667		0.122		23454.2	
	(0.738)		(0.156)		(18394.1)	
Death age	0.107*		-0.026		3689.3**	
	(0.057)		(0.016)		(1728.5)	
Age		0.029		0.005		205.0
		(0.026)		(0.016)		(1301.3)
Fair or poor health	-0.600	-1.043***	-0.687***	-0.589***	-13868.5	-48413.1***
	(0.369)	(0.159)	(0.165)	(0.115)	(17501.6)	(10887.5)
ADLs	0.044	-0.328	-0.376	-0.524**	-8212.8	-26363.1**
	(0.326)	(0.254)	(0.276)	(0.242)	(15460.7)	(11385.0)
Medical expenditure		0.085***		0.075***		3326.9*
		(0.026)		(0.019)		(1749.1)

Table 6. *Roy Model Regressions of Average Income/Poverty, Wealth, and Financial Wealth* (cont'd)

	Income/poverty		Log wealth		Financial wealth (linear)	
	Widows	Non-widows	Widows	Non-widows	Widows	Non-widows
Race						
Black	-0.787***	-1.257***	-0.658**	-1.022***	-86176.6***	-98813.7***
	(0.269)	(0.170)	(0.275)	(0.134)	(11082.7)	(14111.6)
Other	0.148	-0.747**	-0.356	-0.391	2146.3	-21009.8
	(0.624)	(0.350)	(0.682)	(0.246)	(39998.6)	(18845.4)
Hispanic	-0.165	-1.313***	-0.865*	-0.547***	-30198.5	-29460.4***
	(0.388)	(0.214)	(0.521)	(0.189)	(20963.6)	(10238.0)
Education						
Less than HS	-0.163	-0.085	-0.757***	-0.654***	-36384.6***	-24014.5***
	(0.302)	(0.175)	(0.223)	(0.134)	(13582.4)	(9075.9)
Some college	1.845***	2.208***	0.518***	0.412***	91061.9***	117071.1***
	(0.614)	(0.169)	(0.170)	(0.095)	(16307.8)	(14918.8)
Working	-0.125	1.749***	-0.306	0.364***	40785.9*	15394.8
	(0.935)	(0.211)	(0.239)	(0.133)	(21935.0)	(14654.7)
Wife variables						
Age	-0.047	-0.057*	0.001	-0.006	-152.7	3433.4**
	(0.032)	(0.031)	(0.016)	(0.010)	(1223.0)	(1353.9)
Race						
Cross-race couple	-0.791	0.003	0.014	-0.236	-74030.1***	-28717.7**
	(0.532)	(0.400)	(0.532)	(0.239)	(26432.5)	(12710.0)
Cross-Hispanic couple	-1.195	0.298	-0.333	0.131	-15752.8	-49940.1***
	(0.779)	(0.544)	(0.669)	(0.339)	(40250.6)	(17299.0)
Education						
Less than high school	-0.204	-0.271*	-0.748***	-0.381***	-43641.6***	-19967.4**
	(0.312)	(0.144)	(0.233)	(0.113)	(12036.3)	(8343.4)
Some college	2.507***	1.728***	0.531***	0.469***	91127.7***	91479.9***
	(0.676)	(0.182)	(0.152)	(0.081)	(16413.3)	(15435.6)

Note: Regressions include cohort dummies and, except for first column, the Inverse Mills Ratio from the selection regression.
Source: Authors' estimates from *Health and Retirement Study* (1992-2010).

Table 7. *Roy Model Regressions of Falling into Poverty and Near-Poverty in the Current Wave*

	Probability of being a widow	Below poverty line		Below 200% of poverty line	
		Widows	Non-widows	Widows	Non-widows
Mean outcome	0.257	0.109	0.035	0.481	0.150
Husband variables					
Medical expenditure last 6 months before death		0.010***		-0.002	
		(0.003)		(0.005)	
Average monthly medical expenditure 2 years before death		-0.005*		-0.007*	
		(0.003)		(0.004)	
Death was expected		-0.013		-0.014	
		(0.010)		(0.013)	
Time to death was less than a year but more than a month		0.018		0.042**	
		(0.014)		(0.019)	
Time to death was over a year		0.002		-0.011	
		(0.012)		(0.016)	
Death age		0.001		0.001	
		(0.001)		(0.002)	
Years since death		-0.001		-0.003	
		(0.002)		(0.003)	
Age	0.023***		-0.001		-0.0004
	(0.000)		(0.000)		(0.001)
Age at marriage start	-0.017***		-0.0001		0.0004
	(0.000)		(0.000)		(0.001)
Fair or poor health	0.109***	0.025***	0.010***	0.056***	0.043***
	(0.005)	(0.009)	(0.003)	(0.014)	(0.005)
ADLs	0.053***	-0.013	0.006*	0.005	0.031***
	(0.007)	(0.009)	(0.003)	(0.015)	(0.006)
Medical expenditure	0.0001		-0.002***		-0.007***
	(0.001)		(0.000)		(0.001)
N	39,228	5,807	33,420	5,807	33,420

Note: Regression in first column includes cohort dummies. Regressions in other columns include wave dummies and the Inverse Mills Ratio from the selection regression.
Source: Authors' estimates from *Health and Retirement Study* (1992-2010).

Table 8. *Roy Model Regressions of Income and Wealth in the Current Wave*

	Income/poverty		Log wealth		Financial wealth (linear)	
	Widows	Non-widows	Widows	Non-widows	Widows	Non-widows
Mean outcome	2.815	5.072	347,500	410,200	158,600	177,000
Husband variables						
Medical expenditure last	-0.026		-0.148***		-6656.9***	
6 months before death	(0.020)		(0.036)		(2281.3)	
Average monthly medical expenditure	0.060***		0.107***		15385.7***	
2 years before death	(0.020)		(0.028)		(2635.3)	
Death was expected	0.128		0.186**		-1261.7	
	(0.078)		(0.091)		(15496.3)	
Time to death was less than a year but	-0.226***		-0.095		14745.9	
more than a month	(0.074)		(0.097)		(13704.4)	
	-0.016		0.053		21335.0	
Time to death was over a year	(0.086)		(0.096)		(13907.7)	
Death age	0.015**		0.040***		6901.6***	
	(0.007)		(0.011)		(2255.9)	
Years since death	0.004		-0.033*		746.5	
	(0.015)		(0.018)		(2085.1)	
Age		-0.001		0.065***		8127.0***
		(0.008)		(0.006)		(1074.3)
Age at marriage start		-0.004		-0.041***		-5959.7***
		(0.008)		(0.006)		(1016.2)
Fair or poor health	0.014	-0.431***	0.033	-0.531***	-6938.7	-46206.9***
	(0.082)	(0.044)	(0.100)	(0.043)	(14163.3)	(6619.0)
ADLs	0.032	-0.300***	-0.117	-0.429***	-1656.5	-24898.1***
	(0.088)	(0.048)	(0.094)	(0.062)	(13372.7)	(6681.0)
Medical expenditure		0.064***		0.095***		8660.2***
		(0.008)		(0.009)		(1564.4)
N	5,764	32,077	5,807	33,421	5,807	33,421

Note: Regression in first column includes cohort dummies. Regressions in other columns include wave dummies and the Inverse Mills Ratio from the selection regression.

Source: Authors' estimates from *Health and Retirement Study* (1992-2010).