Union Employment and Old-Age Health: Evidence from the Health and Retirement Study[*]

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Abstract: Utilizing males in the first wave of the Health and Retirement Study, this paper examines the effect of long-term union employment on worker health in old age. Union workers have a persistent, pronounced health deficit, relative to nonunion workers, despite having numerous job characteristics that improve health. This gap is multifaceted, appearing in physical and mental health, functionality and chronic conditions, care use, mortality and self-reported health. In some cases, controlling for personal and job characteristics explains most of the gap, but not for physical health. This in turn leads to higher mortality and lower self-reported health among union workers.

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Health is multifaceted, as are the factors that produce it. The two are generally related via a production function for health capital, in economics, or a model of health deficits, in gerontology.

These approaches could be considered piecemeal in that they emphasize the effect of each factor in isolation (while acknowledging substitutabilities and complementarities among them). But there is also a broader level of analysis that emphasizes the role of institutions, political outcomes, or cultural phenomena that affect many factors simultaneously, while possibly also having an independent effect of their own. This systemic approach can yield insights that a more piecemeal approach would overlook.

This type of analysis may be best exemplified by the traffic safety literature, which has long emphasized how social attitudes, media, legislation, and enforcement jointly engender improvements in driver behavior. For example, Ross (1992) emphasizes how social attitudes both foster stricter drunk driving legislation and make that legislation more effective, a theme extended by Grant (2021), who shows how the 1980s reduction in drunk driving in the U.S. resulted from media-inspired changes in social attitudes that fostered stricter legislation and reductions in drinking. Many studies in this literature illustrate how media campaigns or legislation without a concomitant shift in social attitudes generate only evanescent results on the roads. In the same vein, each of Esping-Anderson's (1990) three types of welfare capitalism (conservative, liberal, social democratic) has unique effects on household time allocation, health care provision, and the resources available to families, which in turn jointly produce maternal and child health. To think of cross-country differences in, say, infant mortality merely in terms of labor force participation, health care spending, income inequality, etc., is to miss the forest for the trees.

Perhaps no institution in the U.S. has a more multifaceted effect on health than unions. Working under a collective bargaining agreement has profound effects on earnings, access to medical care, and the nature of work that are all known to influence health. Union workers earn more than comparable nonunion workers (Budd and Na, 2000, and many others) and receive more fringe benefits, including health insurance (Buchmueller, Dinardo, and Valletta, 2002). Unions advocate for occupational safety and ensure employees "take up" workers' compensation when they are injured (Hirsch, Macpherson, and DuMond, 1997). They affect work-related stress, both while on the job and through fear of job loss (Blanchflower, Bryson, and Green, 2022), and alter the length of the workday and the amount of vacation and sick time (Farber et al., 2018). And unions affect the incidence and generosity of pension plans, facilitating earlier retirement (Freeman and Medoff, 1984). Knepper (2020) contains a more thorough review with many additional citations.

Nevertheless, research on unions' effects on health is sparse and contradictory. Wels' (2020) longitudinal analysis finds a positive effect on mental and physical health in Great Britain, though these results may not extrapolate to the U.S., where the nature of collective bargaining and the provision of health care are much different. Reynolds and Brady's (2012) analysis of repeated cross-sections from the 1973-2006 General Social Survey finds that union members have worse self-reported health but that health status is ameliorated by union coverage. However, this data set contains limited information on survey respondents and is not longitudinal; it can only relate a worker's current union status to their current health status. These limitations are relaxed in a final study, Eisenberg-Guyot et al. (2021), which relates unionism to self-reported health using the Panel Study of Income Dynamics, and finds no

relationship between the two. However, more than three-quarters of the individuals included in this survey are under 40 years old, which may simply be too early to detect significant differences in health.

In summary, the existing research on this topic is scarce, somewhat problematic conceptually, and conflicting, and does not investigate the pathways by which union coverage affects health. There is much room for further study. That is the purpose of this paper, which employs rich data on older adults to investigate how and why union employment affects the health if American workers.

As such, it joins a small but growing literature on the "extra-economic" effects of unions in the U.S.–that is, outside of the immediate economic effects on the worker, which have been thoroughly studied, as noted above. Bookending this paper is Downes (2024), who finds that unionism also affects the beginning of life: fertility. Of the additional fertility during the Baby Boom, 20% is explained by union growth subsequent to the 1936 passage of the National Labor Relations Act. Meanwhile, Han (2025) finds that unionization of the school food workforce improves students' standardized test scores, especially among disadvantaged children. In contrast, Budd et al. (2023) find that the mother's history of union employment has little effect on their childrens' behavior, cognitive skills, or educational attainment.

I. Differences in the Health of Union and Nonunion Workers

Themes from the Literature on Occupational Effects. While the literature says little about union/nonunion health differences, it speaks more loudly on the influence of occupation,

introducing themes that will inform our analysis.

As to timing, these studies find cumulative influences of job characteristics (Fletcher et al., 2011), which can damage but not repair health (Morefield et al., 2011). Such influences are particularly strong in early to mid-career (Nicolas et al., 2020), with occupational health differences being relatively persistent after age fifty, neither widening nor narrowing appreciably (Case and Deaton, 2005, Fig. 6.4; Schmitz, 2022; Gueorguieva et al., 2009).[1]

Causal factors are both physical (Fletcher et al., 2011; Morefield et al., 2011) and "psychosocial"–stress arising from role ambiguity, lack of job control, workplace conflict, etc. (Lang et al., 2012; Shirom and Kirmeyer, 1988), with the latter being at least as important as the former (Ravesteijn et al., 2018, Fig. 3; Abeliansky and Strulik, 2023). On the other hand, neither environmental (Schmitz, 2016; Fletcher et al., 2011) or workload (Fletcher et al., 2011; Ravesteijn et al., 2018) factors matter much. Furthermore, the total effect of causal factors is outweighed by selection, in which less healthy people take less healthy jobs (Ravesteijn et al., 2018; this is somewhat counter to the theory of Strulik, 2022).

These themes are potentially relevant to the analysis of union/nonunion health differentials. If any such differentials exhibit late-life persistence, as occupational differentials do, subtle differences in timing need not be investigated, because they will not exist. At the same time, union/nonunion differences in dispute resolution procedures, job definitions, workplace standards, and the industrial relations climate could relate to physical and psychosocial factors that influence health. Finally, nonrandom selection into union jobs–a major

[1] See also Nicolas et al. (2020). The lack of narrowing is counter to the "Compensation Law of Frailty." This corollary of the well-established Compensation Law of Mortality implies convergence in the incidence of medical conditions or functional limitations with age.

theme in the union wage literature–may also hold in terms of health. This selection could be positive or negative–i.e., healthy or unhealthy people may be more likely to have union jobs.

Data. The study of unions' effects on health is fundamentally different than, say, the studies of union wage effects that are so prevalent in the literature. Wages are a flow. Thus, we do not think of current pay as influenced by past union status, only current union status. Health, on the other hand, is a stock. In the health capital model common in economics, health capital builds and depreciates over a long span of time. In the health deficits model common in gerontology (e.g., Strulik, 2018, and cites therein), these deficits accumulate over a similarly long time span. Either way, current health can be expected to depend on the amount of union "exposure"–time spent working for a unionized employer. At the same time, differences in health capital depreciation (or health deficit accumulation) may take time to manifest in observable conditions and functional limitations. For both reasons, union health effects will be most apparent in older individuals.

This consideration and the multifaceted nature of health prescribe the ideal data set for our purposes. It should contain large numbers of older individuals, document their work history and job characteristics, and include a variety of measures of functionality and health. Only one source in the U.S. satisfies these criteria: the Health and Retirement Study (HRS).

The HRS began in 1992 with about 8,000 households, incorporating additional households in waves over time, and continues to operate today. Beginning in their 50s, individuals are interviewed every two years until death, and asked detailed questions about their employment, income, functionality, and health. Including retrospective employment

information obtained upon entry into the survey, one can characterize roughly the last twenty years of each interviewee's working life. There is also detailed information on relevant control variables, such as schooling and demographics, and sample attrition outside of mortality is rare.

The employment information contained in the HRS includes the amount and type of work, union status, job requirements, working conditions, earnings and benefits, pensions, and job-related stress. The health questions are even more wide-ranging. They inquire about health insurance and health care utilization; self-reported health; health behaviors; mental and physical health; chronic conditions and major diseases. Functionality questions address a wide variety of mental and physical limitations and activities of daily living. An "exit survey" is conducted if the subject dies. In summary, this survey contains the information needed to adequately characterize individuals' union status in the decades before retirement and relate it to subsequent measures of their health and functionality. Because it contains so much employment information, the pathways by which unions influence health can also be examined.

Tractability and econometric considerations force the imposition of some structure on this data. We focus on males in the first wave, whose prime working years would have occurred in the 1960s, 1970s, and 1980s, when union density was relatively high (and women's labor force participation relatively low). While the HRS's biennial longitudinal surveys permit a detailed examination of the interplay between health and employment in late adulthood, endogeneity concerns would abound. We thus adopt a simpler approach designed to minimize these concerns, characterizing workers' employment–including union exposure–just prior to turning fifty-five (when there is a small wave of retirements), and relating that to mortality and a variety of health and functionality measures from ages fifty-five through eighty, implicitly

treating all subsequent changes in income, employment, union status, health care use, etc., as endogenous–that is, potentially influenced by contemporaneous health.

Because changes in health capital/deficits are gradual, we divide workers into three groups, based on our knowledge of their union exposure: 1) those with under ten years of tenure on their current or most recent job just prior to turning fifty-five; and their 2) unionized and 3) non-unionized complements. Comparing these last two groups draws the greatest contrast for our purposes, between workers with substantial recent union exposure and those with none. For simplicity, we refer to these three groups as "short tenure," "union," and "nonunion."

Descriptive Findings. Variable means and standard deviations are placed in the two leftmost columns of Table 1. Each refers to the interview or job just prior to turning fifty-five, which we term the "base period."

The top half of Table 1 contains demographics. Differences between (long-tenured) union and nonunion workers conform to established findings: union workers have more tenure but less education, and are equally likely to be married but more likely to be nonwhite. The bottom half of the table represents individual factors related to health production. Genetics are reflected in the (eventual) age of death of the worker's parents. It is one year smaller for both the mothers and fathers of union employees. In terms of behaviors, union workers have modestly higher blood pressure and body mass, but smoke less. On balance, union workers' genetics and behaviors are less conducive to good health, though the differences are modest.

To depict differences in health and functionality, we graph select variable means nonparametrically by age for each of our three union status groups. These variables fall in four

categories: physical limitations, mental health, the level of care utilized, and health conditions. The first three are placed in Figure 1 and the last in Figure 2. Unless noted, larger values indicate less functionality or worse health.

The top portion of Figure 1 graphs the mean value of indexes of two common types of physical limitations: mobility (walking, climbing stairs) and "large muscle" (crouching, pulling a large object, getting up from a chair, etc.). Each trends smoothly upward with age, as expected, and each follows a clear hierarchy: low tenure workers have the most limitations, followed by union workers, followed by nonunion workers, who have the fewest. In other words, union workers have less physical functionality, regardless of age.

The middle portion of Figure 1 contains two measures of mental health or functionality: an index of depressive symptoms (can't sleep well, felt sad, etc.), and an index of cognitive functioning (word recall, counting, etc., for which higher values are better). There is little movement in the depression index, at least among long-tenure workers, but a steady decline in cognition. In both cases, again, nonunion workers perform better than union workers (while short tenure workers' relative placement varies).

At the bottom of Figure 1 are two measures of care utilized: hospitalization and home care. Both rise steadily as individuals age. Again the incidence for union workers is higher than for nonunion workers, though this difference narrows in old age. (Short tenure workers generally have a higher incidence still, on both measures.)

Figure 2 graphs a variety of important health conditions. The top portion contains an index of eight conditions (high blood pressure, cancer, diabetes, etc.) and the incidence of heart problems. Both trend steadily upward; again the values are lower for nonunion workers. The

middle portion illustrates the incidence of arthritis and back problems. These are more frequent with age and less frequent for nonunion workers. The last row plots mean Body Mass Index (BMI) and the incidence of high blood pressure (HBP). There is little differentiation for HBP, but BMI is consistently highest for union employees. Overall, nonunion workers generally perform best on all six measures, with short tenure and union employees vying for second place.

The major takeaway from Figures 1 and 2 is that the union health deficit is *comprehensive* and *persistent*. It appears in indicators of physical and mental health, and physical and mental functionality, regardless of age. Across the twelve measures presented in Figures 1 and 2, union workers outperform nonunion workers in only a handful of instances (brief age ranges for specific indicators). For this reason, our main empirical analysis can focus on two important, general measures of health: mortality and self-reported health. As we will show, these display the same persistent differences seen in Figures 1 and 2, such that a single coefficient adequately represents the effect of union employment on the dependent variable.

II. Differences in Union and Nonunion Jobs

Just as in the literature, union and nonunion jobs in the HRS are quite different. We show this in the means in the left two columns of Table 3. Union workers' wages and income greatly exceed those of their nonunion counterparts, but their wealth and household income are substantially lower. Union workers are more likely to have (private) health insurance currently and in retirement, and are much more likely to have a pension. In addition, union jobs require fewer weekly hours but involve much more lifting and physical effort. While the differences in

union and nonunion workers' backgrounds and health behaviors are modest, they have quite different jobs, incomes, and benefits.

These differences persist when controlling for basic personal and job characteristics, consistent with the methods used in this literature. This is shown in the middle column of Table 3, which presents the results of a basic regression model in which various job features serve as the dependent variable and the independent variables consist of the aforementioned union status dummies and a "basic" set of controls: dummies for Census division, one-digit industry, one-digit occupation, and interview year, two race dummies, a dummy for being married with spouse present, years of education completed, and job tenure.[2] The job features that sequentially serve as the dependent variable are listed along the table's left edge.

We make nonunion workers the omitted category and include dummies for union workers and short-tenure workers. Thus, the estimates on the union dummy in Table 3 compare (long term) union workers to their nonunion counterparts, controlling for basic personal and job characteristics. To improve the precision of the estimates on the controls, short tenure workers are included in the regression, but their estimates are not separately presented.

The first four rows of the table examine union effects on financial variables. The effect on wages, about 25%, exceeds the literature's more typical 15%, but is in line with Hirsch's (2004) careful assessment of the cross-sectional union wage premium, accounting for data issues earlier studies had often overlooked. (Estimates from longitudinal or regression discontinuity

[2] Because these all refer to the current or most recent job held before turning fifty five, all respondents are quite similar in age. Thus, the interview year dummies account for variation in the price level over time, while the education control also accounts for potential work experience (that is, the number of years available for full time work since finishing school).

analyses are smaller.) Either way, this wage advantage is not matched by wealth or *household* income, which reflects spousal contributions and inherited wealth as well as own earnings.

The next five rows examine working conditions. Union jobs involve a smaller amount of more intense work. There are roughly 5% fewer hours of work per week, but that work requires more lifting and physical effort. The last four rows examine job benefits that are particularly important in old age: health insurance and pensions. As in the literature, union workers fare well on all dimensions. They are more likely to have (private) health insurance currently and far more likely to have it in retirement. Their chances of having a pension generally, and a defined benefit pension specifically, are also vastly higher.

For our purposes, the major gap in the HRS is the near-absence of psychosocial factors. Its single measure, whether the job is stressful, is somewhat favorable to union jobs. But this variable alone cannot do justice to the range of factors represented in the well-supported "work dissatisfaction" model of union participation, which includes job satisfaction, satisfaction with management, role conflict, autonomy or job control, opportunities for growth, and so on (Cohen, 1993; Premack and Hunter, 1988). We must turn to the literature to fill this gap.

The psychosocial job characteristic best understood in this literature is job satisfaction. Research has consistently demonstrated that union workers of this era have lower job satisfaction than their nonunion counterparts (Freeman, 1978; Borjas, 1979; Blanchflower et al., 2022). Artz et al. (2022) probe further using a longitudinal analysis and find that unionism had a positive causal effect on job satisfaction that partially offset a larger, negative selection effect, by which those less disposed to job satisfaction were especially likely to be in union jobs. These findings are logically coherent, as these individuals likely received greater returns from an

environment that was better suited to voicing and addressing worker concerns, consistent with the work dissatisfaction model (Premack and Hunter, 1988).

The one study we found examining union effects on psychosocial factors generally, Shirom and Kirmeyer (1988), is consistent with these findings. Union members reported greater work ambiguity and role conflict (but similar workload levels), which could be causal or the result of the aforementioned selection. Either way, the influence of these and other factors on "somatic complaints" was larger for nonunion employees, and the incidence both of stressors and somatic complaints was lower in more functional unions. Collectively, this evidence indicates negative selection into unions in terms of psychosocial factors, which influence health, but are themselves ameliorated by effective union representation.

In summary, the raw differences in job characteristics observed in the HRS are consistent with the literature cited above. Many of these features should improve health: income, (fewer) weekly hours, health insurance, and pension receipt. However, these are offset, to a degree, by other features working the other way, including household wealth and work intensity. To fully understand differences in union and nonunion workers' health, we must consider the effects of these job characteristics and the role of psychosocial factors.

III. Estimation

While supplementary estimates are obtained using basic regression, neither of our two primary health indicators, mortality and self-reported health, are amenable to such a model. To analyze self-reported health, which is reported on an ordinal scale, we use an ordered logit

(which has an odds-ratio interpretation that the ordered probit lacks). Analyzing mortality requires a hazard model. Nonetheless, the same general approach can be employed in all three models to examine the role of various factors associated with unionism.

This approach is most easily illustrated for regression. Let Y be a measure of health or functionality, which can be continuous or binary (rendering the regression a linear probability model), and S be a vector of two union status dummies, for union employees and short tenure workers, with nonunion employees being the omitted reference group. Utilizing HRS sampling weights to assure national representativeness, regressing Y on S yields the raw difference in outcomes, which is the estimate of the parameter vector σ_1:

$$Y = \alpha + \sigma_1 S + \varepsilon \quad \textbf{(1)}$$

where α is a constant and ε is an error term.

Of greater interest are union status differences across similar workers in similar jobs–that is, accounting for fundamental personal and job characteristics. This is accomplished by including the basic set of controls itemized in the previous section, placed in a vector X with associated parameter vector ß. We do not think of these controls as being caused by unionism: e.g., unionization causing employment in manufacturing or receipt of a college degree. Instead, these are controls in the classic sense, used to homogenize the comparison between union and nonunion workers.

$$Y = \alpha + \sigma_2 S + \beta X + \varepsilon \quad \textbf{(2)}$$

In contrast, other variables Z may be caused by union status, including pay, benefits, and

working conditions. These can be considered mechanisms by which union status influences health. The indirect effect of unionism operates through these mechanisms; the direct effect, if any, is what remains after all indirect effects have been accounted for.

In the equation above, σ_2 picks up both direct and indirect effects. Incorporating Z into the regression separates the two:

$$Y = \alpha + \sigma_3 S + \beta X + \gamma Z + \varepsilon \quad \textbf{(3)}$$

Unions' direct effects are now in σ_3, while the parameter vector γ captures the effect of the mechanisms in Z. We call this the "full specification." The indirect effect of any particular mechanism is uncovered by omitting that variable from Z and noting the change in the estimate of σ_3. As before, all explanatory variables–S, X, and Z–are measured in the base period, while all dependent variables Y are measured between the ages of fifty-five and eighty.

As an ordinal variable, self-reported health must be analyzed with an ordered probit.[3] It is reported on a five point scale: "excellent," "very good," "good," "fair," or "poor." To this we add the worst option, death, and include the individual in the sample once after they die:

[3] Treating self-reported health as a cardinal index is impractical for two reasons. One response option ("fair" health) is rarely chosen, and it would be presumptuous to treat death as "just one notch worse" than poor health. In terms of the model specified in this paragraph, the μ thresholds separating the response options are not evenly spaced apart.

$$H_{j,i} = \omega W_{j,i} + \varepsilon$$

$$\begin{aligned} &\textit{Most Favorable Response iff } H_{j,i} < \mu_0 \\ &\textit{Next Less Favorable Response iff } \mu_1 > H_{j,i} \geq \mu_0 \\ &..... \\ &\textit{Least Favorable Response iff } I_{j,t} \geq \mu_{MAX} \\ &\mu_0 = 0,\ var(\varepsilon) = 1 \end{aligned} \qquad \textbf{(4)}$$

where W is a set of explanatory variables discussed in the next section, ω is the associated parameter vector, i indexes "age intervals" described below, and H is the latent variable governing self-reported health. The thresholds separating these options are represented by the μ parameters in the model above, where lower is better. Thus, a negative value of H indicates excellent health.

To analyze mortality, we use the standard semiparametric proportional hazard model, which allows a flexible baseline hazard of death that is augmented (positively or negatively) by the parametric effects of control variables whose proportionate effect on this hazard is constant across time. The hazard analog to equation **(3)** is specified as follows:

$$\lambda_j(a) = \lambda_0(a)\exp(\sigma_4 S + \beta X + \gamma Z) \qquad \textbf{(5)}$$

where λ_j is individual j's chances of dying in month a, given that they lived to age a-1, and λ_0 is a flexible baseline hazard. Here σ_4 reflects the proportionate effect of union status on the chances of death at any given age.

IV. Primary Health Indicators

Self-Reported Health. Self-reported health is measured in each biennial survey wave of the HRS. We wish to both illustrate how it evolves over time and provide a summary measure of individuals' self-reported health over the 55-80 age range on which we focus.

To impose minimal structure, we first establish two year age intervals, 55-56, 57-58...79-80, which are indexed by i. We then pool all survey waves and relate self-reported health to a set of interval dummies and a set of individual fixed effects, such that $\omega W_{j,i} \equiv \delta_j + \tau_i$. Each individual fixed effect δ_j provides a single, model-based summary measure of that person's health in old age, while the interval dummies τ capture how self-reported health worsens with age, that is, $E(\Delta H/\Delta i) > 0$, since higher H indicates worse health.

The histogram at the top of Figure 3 depicts the individual fixed effects, classified by union status in the base period. The three distributions conform in their normality and large variance but differ in the mean. The standard deviations of roughly two exceed the difference between any two μ thresholds estimated in the model, affirming that self-reported health in old age varies widely. Despite this variation, there are clear differences by union status. Lower values, representing better health, are observed for nonunion workers; short tenure workers have higher values, with union workers in the middle. This hierarchy largely conforms to that for the health and functionality indicators displayed in Figures 1 and 2.

These estimated fixed effects can be related to the S, X, and Z variables in our full specification in order to unpack the role of controls and mechanisms. The results are placed in the left panel of Table 2 and the penultimate column of Table 3. The coefficient estimates on the controls largely align with expectations. Self-reported health has a genetic component, reflected in paternal and (especially) maternal longevity. It is worsened by poor health behaviors

and improved by education, job tenure, and marriage. Neither workload (hours/week, weeks/year) nor physical demands (effort, lifting) diminish health, but job stress has sizeable effects. So do income, health insurance, and (arguably) a pension.[4]

The union and short tenure coefficient estimates indicate the direct effect of union status, net of any controls. The uncontrolled estimates of approximately 0.6 indicate that union and short tenure workers have a disadvantage in self-reported health of roughly one-fourth of a standard deviation, compared to their nonunion counterparts. For short tenure workers, this estimate diminishes substantially upon the inclusion of controls, and becomes statistically insignificant. These controls explain most or all of the short tenure deficit in self-reported health, with the basic controls doing all of the work.

The scenario for union workers is much different. The coefficient estimate falls notably in the basic specification, but then rises in the full specification, eclipsing its original value. This finding, which will be repeated throughout the paper, indicates that the influence of basic controls (which worsen union workers' health) is offset by that of mechanisms (which ameliorate it), such that the uncontrolled and fully controlled union estimates are similar. In that final, full specification, the direct effect of unionism is to harm health substantially.

These person-level estimates are complemented with "survey-level" estimates, in which observations of self-reported health are pooled across all survey waves satisfying our age criteria. These estimates reflect the average self-reported health experienced during old age, such that individuals who live longer have more observations in the pooled data and thus "count

[4] The wages coefficient is positive, but the total effect of higher hourly pay influences income and household income as well. This total effect is unambiguously positive. Only the lifting and stress estimates are genuinely unexpected.

more" in estimation. The results are placed in the right panel of Table 2 and the rightmost column of Table 3. The coefficient estimates are uniformly smaller, a consequence of "homogenizing" the sample by "counting" healthier people more, the basic patterns identified above persist. In particular, the addition of controls does not pull the union estimate toward zero–instead, it increases it. Union workers have worse health despite having job characteristics that enhance it.

The middle graph in Figure 3 incorporates the temporal dimension, displaying the trend in self-reported health by union status. It was created by interacting the interval dummies with union status, that is, $\omega W_{j,i} \equiv S_j \times \tau_i$ (setting the value for union workers in the middle period to zero, as the omitted category, and eliminating the individual fixed effects, which is necessary for identification). The trend is upward (toward worse health) for all groups, as expected, and nonunion workers' health consistently exceeds that of union workers. As with previous indicators, the union status hierarchy in self-reported health is consistent over time.

The bottom graph reproduces these trends after accounting for various sets of controls: first the fundamental personal and job characteristics in the basic specification, then adding behaviors–HBP, BMI, and smoking, all measured in the base period, and ultimately including mechanisms, using the full specification. It presents union status effects for each time interval, again interacting τ_i with S (and omitting the short tenure results for brevity). It affirms both the survey-level estimates in Table 2 and our earlier findings of consistency in relative union effects over time. Across time intervals, the union dummies are more alike than different.

In summary, there is a sizeable gap in the self-reported health of union and nonunion workers: one-half unit in the latent variable in the person-level analysis, almost one-quarter of a

standard deviation. No more than half of this is accounted for by basic controls such as occupation and education, which are less favorable for union workers. However, mechanisms associated with union status–job characteristics, including insurance and pension receipt–are more favorable for union workers, and exert a nearly equal effect the other way. Ultimately, the direct effect of union employment is at least 0.5 units, similar to these workers' raw difference in self-reported health. Union workers are demonstrably less healthy, despite having numerous health-enhancing job characteristics.

Mortality. The differences observed in self-reported health also appear in mortality.

This is shown in the survival analysis plot in Figure 4, which focuses on the 55-80 year old age range, as before.[5] Survival probabilities are consistently highest for nonunion workers, less for their union counterparts, and much less for short tenure workers. The differences between these three groups are meaningful. About half of the nonunion workers in the sample live to the age of 80, about five percentage points more than nonunion workers and ten percentage points more than short tenure workers.

These differences are summarized in the "no controls" estimates in the third column of Table 1. Compared to nonunion workers of the same age, union workers' mortality rate is about 16% higher, with short tenure workers' rate higher still. For short tenure workers, controls again explain the entire difference: the coefficient estimate remains positive but loses significance

[5] Most respondents enter the survey at an age that would permit them to have lived to 80 by the date of the final survey, in 2022; the model accounts for (right) truncated observations for those few exceptions. Note that the Compensation Law of Mortality again does not manifest; the union/nonunion survival gap instead grows as one approaches eighty.

with the addition of the basic controls and deteriorates further in the full specification. For union workers, the opposite occurs. The coefficient estimate narrows when adding the basic controls to the model, then grows with the addition of health behaviors and detailed job characteristics. In the full specification, the direct effect of unionism on mortality risk slightly exceeds 16%. As with self-reported health, the net effect of all controls is almost nil, so that the direct effect and the raw effect of unionism nearly equate.

In this specification the influence of controls, displayed in Tables 1 and 3, largely conforms to expectations. Mortality risk is significantly elevated by smoking, high blood pressure, or being without a spouse, and falls with education, job tenure, own-income, and pension receipt. In contrast, the estimated effects of work intensity and physicality, along with health insurance in retirement, are small. A few remaining estimates are imprecise.

In summary, health differences between long-tenure nonunion workers and short tenure workers are sizeable but explicable. They are fully accounted for by controls, which vary dramatically between these two groups. Differences between long-tenure union workers and their nonunion counterparts are another story. For both mortality and self-reported health, the net effect of all controls is essentially nil, maintaining the sizeable raw difference between these two groups, which favors nonunion workers.

V. Frailty and Functionality

In the addition to the two summary health measures we have just examined, the HRS contains numerous detailed functional limitations and health conditions, some of which were

shown in Figures 1 and 2. To round out our analysis, we analyze these using regression, employing the same range of models introduced in Section III. The σ estimates are placed in Table 4, with the remaining estimates suppressed for brevity. For every indicator but one, cognition, larger values are worse. Each dependent variable is measured repeatedly for each individual while they are aged 55-80, and included in the sample each time it is measured.

We begin with the functional limitations in the top panel of the table: mobility, large muscle, gross motor skills, and fine motor skills. The point estimates on the union dummy are consistently positive, no matter which measure or specification is considered. However, they steadily diminish in magnitude as more controls are added to the specification. In the final, full specification, the estimates–though still positive–are neither individually nor jointly significant. This is "even more true" for short tenure workers, where the pont estimates move from positive to (insignificantly) negative as the specification becomes more elaborate.

Turning to mental health, in the second panel of the table, union workers have an uncontrolled deficit on all three measures–cognition, depression, and psychological problems. This deficit again falls as controls are added; in the full specification, the estimates are mixed in sign and insignificant, individually or jointly. A broadly similar trend is observed for short tenure workers as well.

The next panel of Table 4 examines the care utilized by the individual: indicators for hospitalization, nursing home care, and home care. The estimates on the left side of the table show that the raw differences in the use of each are positive for union and short tenure workers, relative to nonunion workers. As controls are added, these estimates move in different directions, becoming smaller for short tenure workers but larger for union workers. In the full

specification, at the right of the table, the union estimates are jointly significant.

For health conditions, in the fourth panel, a similar dynamic occurs. These four variables–a multifaceted index and indicators for health problems, heart problems, and arthritis–are more common for union and short tenure workers. For short tenure workers, these differences are eliminated upon the inclusion of controls, but those for union workers remain. The estimates for this latter group are jointly significant in the full specification.

Finally, the bottom panel of the table considers health behaviors: smoking, BMI, and high blood pressure. (As dependent variables, these are measured for ages 55-80, as stated above. When used to control for behaviors, the values in the base period are utilized, as with all independent variables.) Though statistical precision and significance are lacking, these are also generally more common for union workers, with or without controls.

The detailed health breakdown Table 4 supports and refines our earlier findings for mortality and self-reported health. There is statistically significant evidence that union workers have more physical health conditions and need more care, and marginally significant evidence that they have more functional limitations. For behaviors and mental health, significance is wholly lacking, though the point estimates are still worse for union employees.

Overall, raw union-nonunion differences in functional limitations, mental health, and behaviors are largely explained by controls: a mix of basic controls and mechanisms, depending on the condition being examined. In contrast, differences in health conditions and care use are largely unexplained by controls, and remain significantly positive for the most part. Union employees' health shortfall occurs primarily in physical health, which manifests in worse self-reported health, greater mortality, and a higher need for care. In contrast, similarly-sized health

differences between nonunion and short tenure workers are wholly explicable by controls. This holds true for all categories: functional limitations, mental health, care, physical health conditions, and behaviors.

VI. Contributing Factors

Mechanisms. While the direct effect of unionism on health is estimated by the appropriate coefficient in our full specification, we have not quantified the role of factors plausibly caused by union status. These factors, itemized in Table 3, consistently differed between union and nonunion jobs, but not so as to consistently favor union or nonunion employees.

We place these factors in three groups: earnings (wealth, income, household income, and wages, in the first four rows of Table 3), work demands (hours, weeks, effort, lifting, and stress, in the middle five rows), and benefits (health insurance and pension coverage, in the last four rows). Multiplying the union-nonunion gap in each variable by the associated coefficient estimate (in γ) and summing those products across all variables in each group yields the group-wise effect on union health, relative to nonunion health. The results are shown below. (Recall that negative numbers are good and positive numbers bad.)

Variable Group	Hazard Model	Self-Reported Health Model (person level)
Earnings	0.020	0.060
Work Demands	0.005	-0.061
Benefits	-0.039	-0.090
Total	-0.014	-0.091

In the hazard model, differences in earnings and work demands serve to mildly increase union workers' relative hazard of death, but the effect of benefits works twice as strongly in the other direction. On net, these detailed job characteristics serve to mildly decrease union workers' mortality, but the effect is small: a net change of 1.4%. This is not even one-tenth of the union-nonunion mortality gap in Table 1. Our findings aren't much stronger for self-reported health. Again earnings differences serve to worsen union workers' relative health, but differences in benefits and work demands both improve it. The net effect, -0.09 units, is not even one-twentieth of a standard deviation in self-reported health.

On balance, benefits–health insurance and pension receipt–have the largest ameliorative effects on health for union workers. This is understandable given that they impact health substantially and differ greatly between union and nonunion workers. Somewhat surprisingly, the net effect of earnings differences work in the other direction. This is because this set of variables includes household income and wealth, where union workers are at a disadvantage. The net effect of work demands is variable and relatively small in magnitude.

On balance, the effect of mechanisms is to improve union workers' health. But the improvements are modest and explain none of the union/nonunion health gap, as this gap isn't favorable to union workers, but unfavorable.

Family. The odd juxtaposition of higher union wages with lower household income and wealth can arise from family structure. Downes (2025) has shown that union jobs increase fertility (and thus child-rearing costs) and lower women's employment. Both would reduce household income and wealth, potentially outweighing the union worker's wage premium.

As shown in the table below, in the base period, union workers are indeed more likely to be married and have more children: both own-children and total living children (including those in blended families). Does this contribute to the union-nonunion health differential?

	Married, Spouse Present	Number of Marriages	Length of Current Marriage	Children Ever Born	Children Now Living	Change in Union Dummy
Union Mean	0.872	1.31	28.75	2.93	3.27	----
Nonunion Mean	0.856	1.27	29.01	2.85	3.06	----
Hazard Model						
Basic Spec.	-0.174	0.227	0.007	-0.030	-0.007	-0.030
	(0.172)	(0.055)	(0.004)	(0.022)	(0.021)	
Full Spec.	-0.195	0.167	0.007	-0.019	-0.041	-0.017
	(0.267)	(0.077)	(0.005)	(0.031)	(0.029)	
Self-Rep Health						
Basic Spec.	-0.325	0.157	-0.003	0.037	-0.042	-0.028
	(0.244)	(0.081)	(0.005)	(0.030)	(0.028)	
Full Spec.	-0.312	-0.045	-0.012	0.077	-0.069	0.014
	(0.346)	(0.098)	(0.006)	(0.036)	(0.033)	

The answer is: somewhat. In three of four specifications in the table, the addition of family structure variables reduces the union coefficient, bringing it toward zero. This operates, especially, through the number of children, which improves health and reduces mortality. Nonetheless, the magnitude of effect is generally modest. Except for the basic specification of the hazard model, where the union dummy falls by one-third, the change in the union effect is less than 10%.

Psychosocial Factors. Our literature review highlighted the relevance of psychosocial factors for health at the occupational level, and the one psychosocial factor included in our full specification, the stress level of one's job, strongly diminished self-reported health (but not

mortality). Can a broad set of psychosocial factors explain union workers' worse health?

Numerous such factors are measured in the HRS–but not until later waves, after the "Leave Behind" survey was introduced in 2004. This questionnaire, completed by roughly half of each wave's respondents, measures the "big five" personality traits, positive and negative affect, loneliness, life satisfaction, and various stressors (summarized, for our purposes, in a chronic stress indicator). We utilize each of these, measured in wave 8 of the survey, to predict self-reported health in wave 9 forward.[6] These and supplementary results are placed in Table 5.

The means in the left panel of the table show small differences in personality. Differences in affect are larger, and those in stress and life satisfaction are sizeable. These work in opposing directions. Nonunion workers have a more positive (and less negative) affect and greater life satisfaction but more stress. These differences sustain in the middle panel of the table, which accounts for controls.

The right panel of the table shows how these factors affect self-reported health, pooling all individual responses from waves 9 forward. For most the effect is modest, such that a 0.1 unit / 1 percentile point change generates a 0.01 or 0.02 unit change in health. However, because some factors favor union workers and others favor nonunion workers, the cumulative effects are relatively small. In the basic specification, the inclusion of psychosocial factors raises the union coefficient estimate slightly; in the full specification, it declines by 0.04 units, or 15%. As with family structure, the cumulative effect of psychosocial factors is marginal.

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[6] Occasionally, wave 9 values were used if wave 8's were unavailable. For some variables, the scale of measurement changed between waves 8 and 9, so each respondent's percentile score within that wave was calculated and those utilized instead. The sample is diminished by roughly half because the chronic stress indicator is not measured in wave 9.

Altogether, these findings paint a picture of union employment as both an economic and a lifestyle choice. Union workers have less stress, better health care, and better benefits, to offset less household income, a poorer genetic health endowment, and less positive dispositions. The former set of factors partially compensates for the health deficits that arise, to some degree, from the latter set.

VII. Conclusion

Differences in the health of long-tenure union and nonunion workers in later life are profound. They are observed across a wide range of measures–physical and mental health, care use, health behaviors, and functionality–always to union workers' detriment. As a result, such workers consistently report being in worse overall health than their nonunion counterparts, and exhibit higher mortality.

To a modest degree, these differences are explicable by fundamental personal and job characteristics, such as education or one-digit occupation–especially for mental health and behaviors. But they widen again upon controlling for detailed job characteristics that plausibly influence health, such as income, health insurance, and pension receipt–especially for physical health conditions. These characteristics generally improve health, making union workers' shortfall that much more puzzling.

Partial explanations arise from key differences in union and nonunion workers' family sizes and stress levels, among other non-economic factors. Nonetheless, union employees' widespread, pronounced health deficit despite these advantages is a largely unresolved mystery.

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Table 1. Select Variable Means and Mortality Hazard Model Coefficient Estimates (standard deviations or standard errors in parentheses).

	Means		Hazard Model (Mortality)			
	Union	Non-union	No Controls	Basic Controls	Add Behaviors	Also Add Detailed Job Controls
Union	----	----	0.156 (0.056)	0.092 (0.064)	0.136 (0.064)	0.184 (0.094)
Short Tenure	----	----	0.252 (0.054)	0.048 (0.081)	-0.025 (0.083)	-0.010 (0.109)
Married with Spouse Present	0.87 (0.30)	0.86 (0.31)	----	-0.383 (0.064)	-0.333 (0.066)	-0.205 (0.095)
Job Tenure in Years	26.3 (7.0)	23.9 (8.0)	----	-0.008 (0.003)	-0.008 (0.003)	-0.008 (0.003)
Black	0.13 (0.01)	0.07 (0.01)	----	0.095 (0.077)	0.006 (0.079)	0.083 (0.110)
Other Nonwhite	0.02 (0.00)	0.03 (0.00)	----	-0.055 (0.150)	-0.057 (0.153)	0.051 (0.200)
Years of Education	12.0 (2.5)	12.8 (2.9)	----	-0.027 (0.009)	-0.016 (0.009)	-0.000 (0.014)
Mother's Age at Death	76.7 (13.4)	77.7 (12.9)	----	-0.007 (0.001)	-0.006 (0.001)	-0.006 (0.002)
Father's Age at Death	71.7 (12.6)	72.7 (12.4)	----	-0.005 (0.002)	-0.004 (0.002)	-0.002 (0.002)
Body Mass Index	27.6 (3.8)	27.1 (3.9)	----	----	0.018 (0.005)	0.025 (0.007)
High Blood Pressure	0.41 (0.44)	0.39 (0.43)	----	----	0.327 (0.050)	0.285 (0.068)
Currently Smoke Cigarettes	0.22 (0.37)	0.24 (0.38)	----	----	0.722 (0.052)	0.733 (0.071)
Detailed Job Controls	----	----	----	No	No	Yes, see Table 3

Note: the last three specifications also include sets of dummies for interview year, census division, one-digit industry, and one-digit occupation. For the means, the sample is not balanced; that is, there are different numbers of observations across variables within categories. The approximate number of observations is 1,000 for the union sample and 2,000 for the nonunion sample. * indicates that lower numbers are better.

Table 2. Self-Reported Health Ordered Probit Coefficient Estimates (standard errors in parentheses).

	Person-Level			Pooled Survey-Level			
	No Controls	Basic Controls	Also Add Detailed Job Controls	Age Control Only	Basic Controls	Add Behaviors	Also Add Detailed Job Controls
Union	0.504 (0.089)	0.299 (0.093)	0.588 (0.115)	0.065 (0.016)	0.098 (0.022)	0.132 (0.022)	0.194 (0.029)
Short Tenure	0.681 (0.083)	0.032 (0.118)	0.136 (0.139)	0.141 (0.015)	-0.040 (0.026)	-0.084 (0.022)	-0.089 (0.033)
Married with Spouse Present	----	-0.642 (0.095)	-0.330 (0.121)	----	-0.401 (0.034)	-0.351 (0.035)	-0.175 (0.047)
Job Tenure in Years	----	-0.023 (0.005)	-0.004 (0.006)	----	-0.013 (0.002)	-0.013 (0.002)	-0.005 (0.002)
Black	----	0.296 (0.118)	0.079 (0.150)	----	0.061 (0.030)	-0.012 (0.034)	0.012 (0.045)
Other Nonwhite	----	0.398 (0.203)	0.348 (0.254)	----	0.061 (0.004)	0.116 (0.047)	0.064 (0.061)
Years of Education	----	-0.155 (0.013)	-0.084 (0.018)	----	-0.110 (0.014)	-0.102 (0.004)	-0.064 (0.006)
Mother's Age at Death	----	-0.014 (0.002)	-0.007 (0.003)	----	-0.007 (0.001)	-0.005 (0.001)	-0.004 (0.001)
Father's Age at Death	----	-0.005 (0.002)	-0.004 (0.003)	----	-0.003 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Body Mass Index	----	----	0.063 (0.010)	----	----	0.049 (0.003)	0.053 (0.003)
High Blood Pressure	----	----	0.528 (0.075)	----	----	0.409 (0.021)	0.320 (0.026)
Currently Smoke Cigarettes	----	----	0.989 (0.094)	----	----	0.689 (0.026)	0.644 (0.033)
Detailed Job Controls	No	No	Yes, see Table 3	No	No	No	Yes, see Table 3

Note: Controls in the basic model include job tenure, industry and occupation dummies, education, census division, race, and interview year (also age in the pooled model). The approximate number of observations is 1,000 for the union sample and 2,000 for the nonunion sample. For the dependent variable, lower numbers are better/healthier. All independent variables recorded shortly before the respondent turned age 55.

Table 3. Means and Estimates for Detailed Job Controls (coefficients, with standard errors in parentheses).

	Mean Union (std. dev.)	Mean Nonunion (std. dev.)	Union Coeff. WLS Model with Basic Controls	Hazard Model	Self-Reported Health* Person-Level	Self-Reported Health* Survey-Level
Log(non-housing wealth)	10.7 (1.3)	11.3 (0.8)	-0.126 (0.065)	-0.051 (0.024)	-0.080 (0.031)	-0.069 (0.010)
Log(household income)	10.6 (0.6)	10.8 (0.6)	0.005 (0.031)	-0.042 (0.076)	-0.208 (0.095)	-0.165 (0.033)
Log(income)	10.7 (0.7)	10.5 (0.8)	0.216 (0.038)	-0.147 (0.123)	-0.377 (0.118)	-0.241 (0.039)
Log(wages)	3.0 (0.8)	2.8 (0.9)	0.242 (0.039)	0.053 (0.120)	0.229 (0.103)	0.131 (0.034)
Usual Number of Hours Worked/Week	43.0 (6.8)	46.4 (11.4)	-2.21 (0.47)	0.002 (0.004)	0.001 (0.005)	-0.000 (0.002)
Usual Number of Weeks Worked/Year	50.6 (4.1)	50.3 (5.1)	-0.23 (0.24)	0.007 (0.007)	0.015 (0.008)	0.008 (0.003)
Job Requires Physical Effort (1-4 scale)*	2.47 (0.94)	2.81 (0.98)	-0.136 (0.046)	-0.015 (0.043)	-0.029 (0.053)	-0.029 (0.018)
Job Requires Heavy Lifting (1-4 scale)*	3.05 (0.89)	3.33 (0.80)	-0.165 (0.041)	-0.001 (0.046)	0.144 (0.059)	0.080 (0.021)
Job Is Stressful (1-4 scale)*	2.24 (0.70)	2.13 (0.71)	0.050 (0.038)	-0.022 (0.042)	-0.317 (0.052)	-0.176 (0.018)
Have Health Insurance Now	0.93 (0.23)	0.84 (0.33)	0.088 (0.014)	-0.074 (0.116)	-0.324 (0.153)	-0.065 (0.053)
Have Health Insurance in Retirement	0.74 (0.39)	0.50 (0.44)	0.193 (0.018)	0.011 (0.076)	-0.142 (0.090)	-0.151 (0.032)
Pension on Job	0.96 (0.18)	0.58 (0.44)	0.262 (0.020)	-0.141 (0.095)	-0.072 (0.121)	-0.066 (0.041)
Defined Benefit Pension	0.53 (0.44)	0.30 (0.41)	0.187 (0.018)	-0.023 (0.092)	0.002 (0.111)	0.017 (0.037)

Note: on the 1-4 scale, lower numbers indicate greater agreement (that the job is stressful, etc.). Controls in the basic model in column three include job tenure, industry and occupation dummies, education, census division, race, and interview year. For the means, the sample is not balanced; that is, there are different numbers of observations across variables within categories. The approximate number of observations is 1,000 for the union sample and 2,000 for the nonunion sample. * indicates that lower numbers are better.

Table 4. Union Effects on Health and Functionality (coefficient estimates and standard errors).

	Raw (no controls)		*Basic Controls*		*Add Behaviors*		*Also Add Detailed Job Controls*	
	Union	Short Tenure	Union	Short Tenure	Union	Short Tenure	Union	Short Tenure
Functional Limitations	0.128	0.183	0.070	0.003	0.068	-0.027	0.064	-0.047
Mobility	(0.041)	(0.038)	(0.046)	(0.057)	(0.045)	(0.056)	(0.053)	(0.058)
Large Muscle	0.164	0.165	0.075	0.027	0.065	0.009	0.013	-0.035
	(0.040)	(0.037)	(0.044)	(0.056)	(0.044)	(0.055)	(0.053)	(0.061)
Gross Motor Skills	0.060	0.102	0.023	-0.046	0.033	-0.053	0.023	-0.050
	(0.026)	(0.024)	(0.029)	(0.035)	(0.030)	(0.035)	(0.032)	(0.033)
Fine Motor Skills	0.024	0.032	0.019	-0.013	0.021	-0.011	0.003	-0.022
	(0.013)	(0.012)	(0.015)	(0.017)	(0.015)	(0.017)	(0.018)	(0.018)
p values	*<.01*	*<.01*	*.02*	*.81*	*.20*	*.43*	*0.22*	*0.99*
Mental Health	-0.656	-0.099	-0.106	0.280	-0.111	0.227	-0.210	-0.339
Cognition*	(0.141)	(0.124)	(0.128)	(0.161)	(0.131)	(0.165)	(0.160)	(0.191)
Depression	0.086	0.238	-0.041	-0.016	-0.033	-0.040	-0.032	-0.089
	(0.050)	(0.049)	(0.053)	(0.069)	(0.053)	(0.070)	(0.067)	(0.076)
Psych. Problems	0.026	0.041	0.021	0.005	0.023	0.007	0.013	0.003
	(0.013)	(0.012)	(0.014)	(0.017)	(0.014)	(0.017)	(0.019)	(0.020)
p values	*<.01*	*<.01*	*.17*	*.81*	*.14*	*.82*	*.22*	*.21*
Care	0.033	0.009	0.030	-0.001	0.032	-0.001	0.040	0.006
Hospitalized	(0.010)	(0.009)	(0.011)	(0.014)	(0.011)	(0.014)	(0.014)	(0.016)
Nursing Home	0.006	0.005	0.007	0.000	0.007	0.002	0.000	0.002
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
Home Care	0.006	0.003	0.005	-0.005	0.006	-0.007	0.011	-0.003
	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)
p values	*<.01*	*<.01*	*<.01*	*.80*	*<.01*	*.71*	*<.01*	*.52*
Health Conditions	0.168	0.124	0.101	-0.034	0.107	-0.024	0.119	-0.011
Index	(0.047)	(0.046)	(0.052)	(0.068)	(0.049)	(0.063)	(0.062)	(0.074)
Heart	0.025	0.022	0.032	-0.001	0.032	-0.007	0.034	0.001
	(0.016)	(0.015)	(0.018)	(0.023)	(0.018)	(0.023)	(0.024)	(0.028)
Arthritis	0.072	0.033	0.047	0.004	0.041	0.007	0.062	0.041
	(0.019)	(0.017)	(0.020)	(0.026)	(0.020)	(0.026)	(0.027)	(0.032)
Back Problems	0.043	0.036	0.031	-0.011	0.035	-0.009	0.020	-0.021
	(0.014)	(0.013)	(0.015)	(0.019)	(0.016)	(0.020)	(0.020)	(0.024)
p values	*<.01*	*<.01*	*<.01*	*.83*	*<.01*	*.82*	*<0.01*	*0.47*
Behaviors	0.007	0.070	-0.013	0.042	0.013	0.014	0.015	0.012
Smoke Now	(0.012)	(0.012)	(0.013)	(0.018)	(0.008)	(0.011)	(0.011)	(0.013)
Body Mass Index	0.428	0.472	0.330	0.023	0.034	-0.018	0.115	-0.028
	(0.189)	(0.166)	(0.204)	(0.254)	(0.098)	(0.128)	(0.133)	(0.156)
High Blood Pressure	0.009	0.001	-0.007	-0.018	0.004	0.001	-0.006	0.006
	(0.019)	(0.018)	(0.020)	(0.026)	(0.016)	(0.021)	(0.021)	(0.026)
p values	*.04*	*<.01*	*.31*	*.08*	*.14*	*.30*	*.16*	*.40*

Note: The basic controls are defined in the text. Standard errors are clustered by individual. P-values are for joint, one-sided significance tests of the estimates in the appropriate panel. * = higher is better.

Table 5. Means and Coefficient Estimates Involving Psychosocial Factors.

	Means			**Union Coefficient in Psychosocial Models**		**Self-Reported Health* Model**			
				Specification		**Specification**			
	Union	Nonunion	Short Tenure	Basic	Full	Basic	Basic	Full	Full
Union	1	0	0	----	----	0.096 (0.059)	0.116 (0.061)	0.287 (0.074)	0.246 (0.077)
Short Tenure	0	0	1	----	----	-0.043 (0.072)	-0.092 (0.074)	-0.171 (0.133)	-0.125 (0.091)
Traits Neuroticism	1.94	1.94	1.99	-0.02 (0.03)	-0.03 (0.04)	----	0.023 (0.067)	----	0.046 (0.081)
Extroversion	3.15	3.16	3.20	0.02 (0.03)	0.02 (0.04)	----	-0.380 (0.080)	----	-0.508 (0.095)
Openness	2.86	2.93	2.95	-0.03 (0.03)	-0.01 (0.04)	----	-0.034 (0.081)	----	-0.119 (0.096)
Agreeableness	3.38	3.38	3.38	0.04 (0.03)	0.02 (0.04)	----	0.227 (0.080)	----	0.227 (0.095)
Conscientious-ness	3.28	3.33	3.30	-0.01 (0.03)	-0.03 (0.03)	----	-0.240 (0.073)	----	-0.285 (0.010)
Positive Affect (percentile)	48.4	50.9	49.2	-1.30 (1.67)	-1.29 (2.05)	----	-0.003 (0.002)	----	-0.000 (0.002)
Negative Affect (percentile)	49.7	47.8	51.5	1.95 (1.68)	1.87 (2.07)	----	0.005 (0.001)	----	0.003 (0.002)
Experiential Loneliness*	1.41	1.38	1.44	0.01 (0.03)	-0.04 (0.04)	----	0.204 (0.073)	----	0.224 (0.087)
Life Satisfaction (percentile)	48.9	52.2	46.9	-0.51 (1.68)	-2.94 (2.07)	----	-0.010 (0.001)	----	0.010 (0.002)
Chronic Stress	0.20	0.26	0.28	-0.10 (0.05)	-0.07 (0.07)	----	0.161 (0.052)	----	0.131 (0.061)

* For loneliness and self-reported health, lower numbers are better (less lonely, better health).

Figure 1. Functionality, Mental Health, and Care Type, by Age and Union Status.

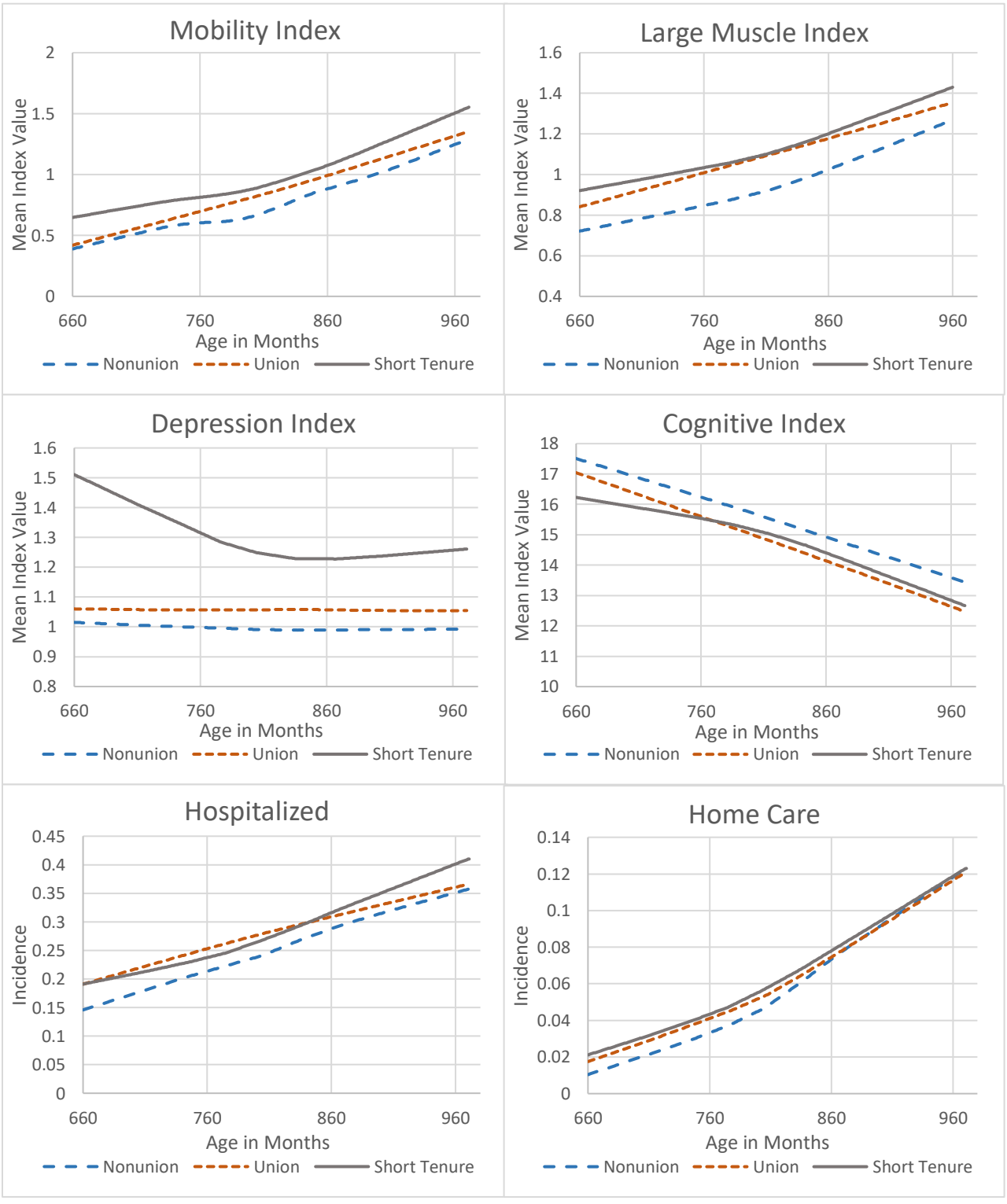

Figure 2. Physical Conditions and Behaviors, by Age and Union Status.

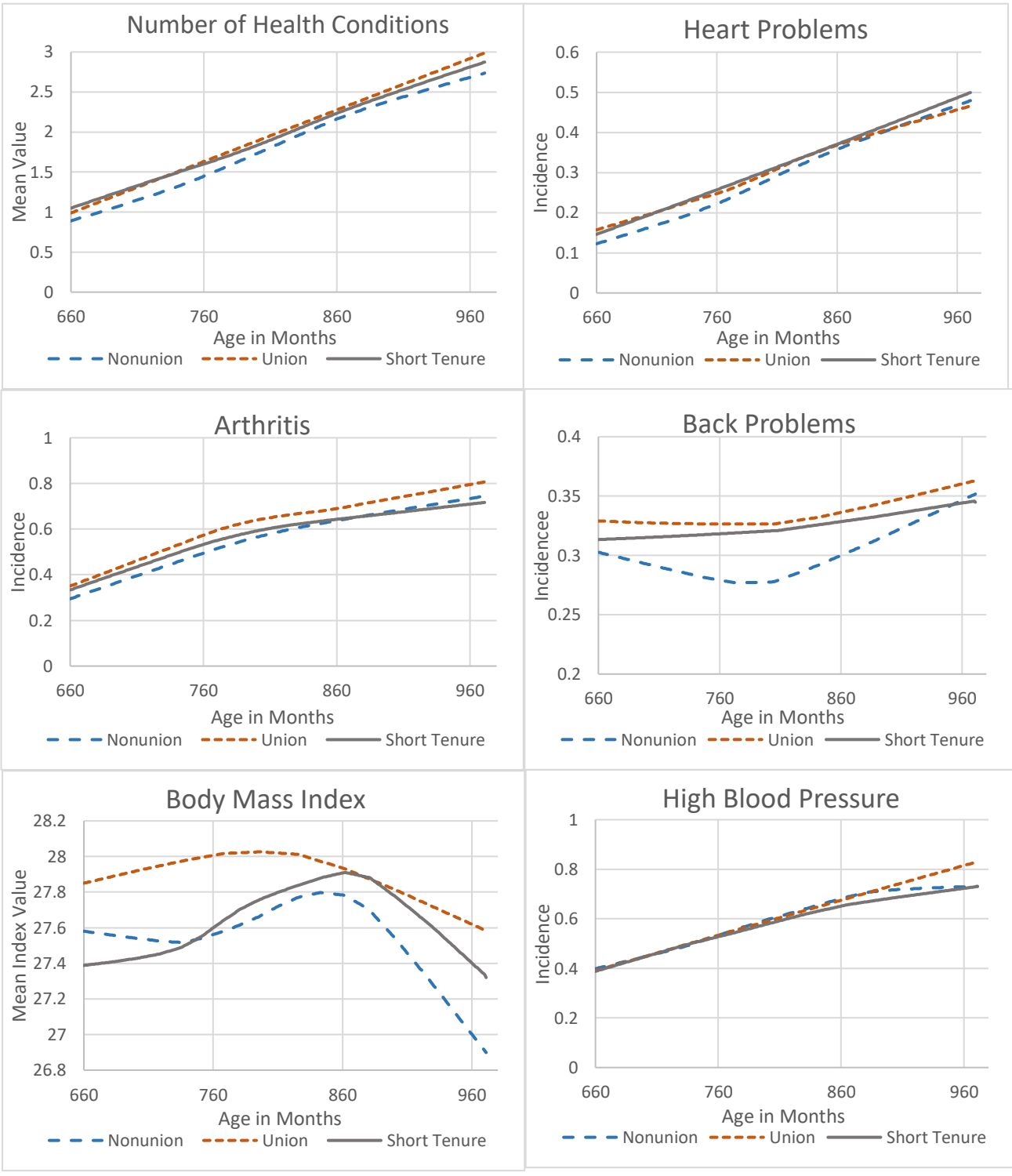

Figure 3. Summary Indicators of Self-Reported Health (ordered probit estimates).

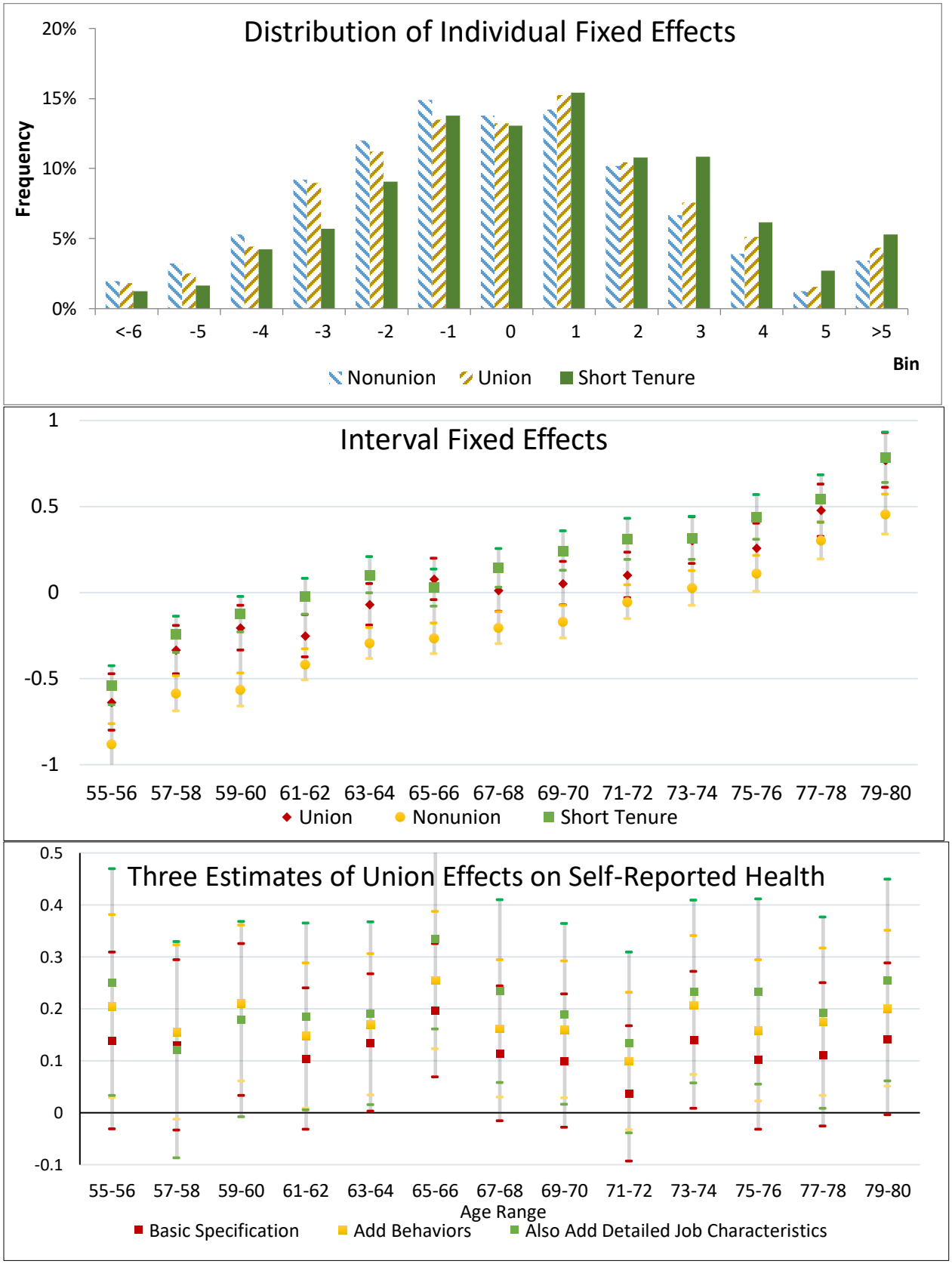

Figure 4. Baseline Mortality Hazards, Ages 55-80.