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ABSTRACT

The Effect of an Acute Health Shock on Work Behavior: Evidence from Different Health Care Regimes*

We study how severe acute health shocks affect the probability of not working in the U. S. versus in Denmark. The results not only provide insight into how relative disease risk affects labor force participation at older ages, but also into how different types of health care and health insurance systems affect individual decisions of labor force participation. We find that the effect of an acute health shock on labor force participation is stronger in the U.S. than in Denmark, and provide compelling evidence that this is the result of health care system-related differential mortality and baseline health differences.

JEL Classification: I12, I18, J26

Keywords: health shock, health care regimes, work

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I. Introduction

Cross country comparisons of health and health insurance systems provide important insights into determinants of health and mortality. Recent studies (see, for example, Banks et al., 2006 and 2010) have provided evidence that despite higher cumulative disease risk, age-specific mortality rates of Americans are similar to those of the English. In this paper, we contribute to this literature by broadening the question of how disease and disease risk differs between countries to the question of how this affects labor force participation at older ages. More specifically, we are interested in the question of how severe acute health shocks (defined as new cancer, heart attack, or stroke)[1] affect the probability of not working in the U. S. versus in Denmark. The two countries enjoy nearly the same level of prosperity and growth and similar levels and trends in population aging and in life expectancy, yet health care systems contrast sharply with income tax-financed universal insurance and nationalized health care in Denmark compared to the 'multi-payer' American health care system dominated by private insurance and with high health care costs. The answers to our question not only provide insight into how relative disease risk affects labor force participation at older ages, but also how different types of health insurance systems – employer-based with relatively high out-of-pocket medical expenditures versus universal ones with barely any out-of-pocket cost – affect individual decisions of labor force participation.

Acute health shocks may reduce desired labor supply by increasing the disutility of work and reducing the ability to work. At the same time, health shocks increase financial needs – for

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[1] This is a commonly used definition of an acute health shock, see, for example, Conley and Thompson (2011).

example, through increased medical cost – and thus may increase desired labor supply. For example, for individuals with low income aged 51 to 64, medical conditions increase health spending at the expense of non-health spending (Butrica et al. 2009). The evidence on the net effect of an acute health shock - such as a heart attack - on labor supply is mixed. Using the first two waves of the Health and Retirement Study (HRS), McClellan (1998) finds that individuals experiencing health shocks are twice as likely to exit the labor force as individuals who do not. Dwyer and Hu (2000) find that developing a new work limitation increases the likelihood of retirement more than having a persistent limitation. Likewise, Coile (2004) finds that an unexpected health shock reduces labor supply. Controlling for unobserved heterogeneity, however, reduces the magnitude of the dynamic relationship between poor health in the previous period and current non-employment (Haan and Myck, 2009). Furthermore, the specific sample under analysis and the type of health shock considered seem to matter. Bradley et al. (2005) find that married women who develop breast cancer are more likely to continue working and even increase the intensity of their labor supply compared to those who do not.

The labor supply response following a health shock should depend on having access to health insurance. If access to health insurance depends on employment, workers have a greater incentive to continue working in order to keep their health insurance. This effect will be even stronger in the presence of higher out-of-pocket medical expenses because of the resulting income effect. Empirical evidence in the U.S. for the link between health insurance coverage and retirement behavior in the absence of a health shock is mixed (Madrian, 2006). Identifying and quantifying the potential effect is difficult because of the potential for self-selection into employment with different types of health insurance coverage and the correlation of health insurance incentives and pension-related incentives with work behavior (Madrian, 2006). There is also evidence that labor market decisions of married couples take into account own and spousal health insurance coverage (Buchmueller and Valletta, 1999; Royalty and Abraham, 2006; van Houtven and Coe, 2010).

Sidestepping these issues by exploiting exogenous variation in U.S. state and federal 'continuation of coverage' COBRA mandates (laws allowing individuals to purchase continuing health insurance for up to 18 months after leaving a firm), Gruber and Madrian (1995) find that access to one year of continuation benefits raises the retirement hazard by 30 percent for men aged 55-64. Boyle and Lahey (2010) exploit the expansion of health care for veterans in the mid 1990s using a difference-in-difference strategy. They find that older veterans – compared to non-veterans and veterans without access to health care – are more likely to stop working and to work less hours.

Other authors have dealt with these issues by estimating structural dynamic programming models of retirement decisions, modeling Social Security benefit rules and health insurance. Earlier models (Lumsdaine et al., 1994; Gustman and Steinmeier, 1994) have found only small effects of health insurance on retirement behavior, but newer and more elaborate models that account for risk aversion and uncertain medical expenditures find bigger effects. Rust and Phelan (1997) find that "health insurance constrained" individuals (those who will lose their employer-provided health insurance once they retire and have no access to actuarially fair private health insurance) are more likely to remain in employment until Medicare eligibility at age 65. Similarly, Blau and Gilleskie (2006) find that availability of employer-provided retiree health insurance has small positive effects on employment. These models lack savings decisions and are, therefore, likely to overstate the effect of health insurance since individuals are not able to self-insure against the risk of medical expenditures (French and Jones, 2011). French and Jones

(2011) explicitly incorporate the savings decision as well as preference heterogeneity for leisure. While they find that health insurance influences the timing of retirement, again the effects are small: a two-year increase in the age of Medicare eligibility increases the average retirement age of men by slightly less than one month. Although structural models are able to correctly evaluate policy reform, because of state space considerations, they typically are restricted to using very crude health controls, such as changes in self-reported health status, rather than actual medical events.[2]

In this paper, we explore the effect of acute health shocks of older workers on the probability of not working. We use the policy variation of two different types of health insurance – universal and employer-provided combined with substantial differences in expected and actual medical out-of-pocket expenditures – to compare whether acute health shocks lead to different effects on work behavior. This circumvents the problem of self-selection into employment with different types of health insurance. To our knowledge, no studies have examined this interaction between health shocks and health insurance systems and out-of-pocket medical expenditures.

Cross-country comparisons improve our understanding of how differences in institutions affect individual behavior, and more specifically in our context, how health and mortality affect labor force participation. The difficulty, which cannot be entirely overcome, lies in identifying the mechanisms involved. Causality is hard to establish since countries differ in many ways but evidence can be used to provide a compelling story. In this study, we find - contrary to what we had expected - that the effect of an acute health shock on retirement is greater in the U.S. than in

[2] For example, Rust and Phelan (1997) measure health status as good, bad or dead, and French and Jones (2011) use a 0-1 indicator of health status (bad, good) and mortality.

Denmark. We provide compelling evidence that differential mortality from cancer and differences in baseline health in the two countries can explain differences in labor supply response to a health shock in the two countries.

The rest of the paper is organized as follows: Section II suggests a theoretical framework, Section III describes the data, Section IV presents the estimation method, and Section V discusses the results and potential explanations. Section VI concludes.

II. Theoretical framework

We present a simple theory of how health shocks influence the retirement decision through the budget constraint. For an individual approaching retirement, the problem is to choose retirement age, *r*, by maximizing the sum of the discounted per period utilities of working from age *t* to age *r-1* and retiring at age *r* and the utilities of retiring thereafter until *T*, the highest possible age:

$$V(r) = \sum_{S=t}^{r-1} \beta^{S-t} U^{W}(C_S, h_S) + \sum_{S=r}^{T} \beta^{S-t} U^{R}(C_S(r), 0 \quad . \qquad (1)$$

The instantaneous utility of work is U^W, which depends on consumption, C_S, and hours worked (negatively), h_S, and the utility of retirement, U^R, which depends only on consumption as workers are assumed to stop working after retirement. The constraints are given by $C_S = wh_S + A_S$, where *A* is asset income, *w* the wage rate, and $C_S(r) = B_S(r) + A_S$, where *B(r)* are retirement benefits, which depend on the age of retirement. Thus, retirement at age *r* is preferred over working another year and postponing retirement to $r+1$ if $V(r) > V(r+1)$. This occurs if

$$U^{W}(C_r, h_r) < U^{R}(C_r(r), 0)\,, \qquad (2)$$

i.e., the current disutility of working more than offsets the loss in consumption by retiring

($C_r(r) < C_r$), in particular if this first order effect of not deferring retirement is sufficiently large in magnitude to dominate the second order effect of foregone benefit accrual:

$$\sum_{S=r+1}^{T} \beta^{S-r}(U^R(C_S(r+1),0) - U^R(C_S(r),0)). \tag{3}$$

This assumption is likely to be satisfied. First of all, the second order effect vanishes in a regime where benefits do not depend on age of retirement once an individual becomes eligible.[3] It may be positive if working another year increases subsequent benefit levels, but it is likely to be small in magnitude. Indeed, most benefits systems are not actuarially fair, and benefit accrual - the increase in expected present discounted value of future retirement benefits if retirement is postponed by a year – is typically negative at older ages (Gruber and Wise, 2004). Thus, the retirement date is taken to be the first date *r* satisfying (2).

Now, suppose the worker suffers from a health shock at age *r*. This may reduce the planning horizon *T*, thus reducing the second order effect (3) and hence reinforcing the relevance of (2) as the retirement criterion. We investigate whether the health shock makes (2) more or less likely to be satisfied. If hours do not adjust there is an income effect, that is, consumption while working is reduced to $C_S^{'} = wh_S + A_S - M_S$, where M_S are medical expenses, and consumption in retirement becomes $C_S^{'}(r) = B_S(r) + A_S - M_S$. Thus, retirement should be delayed if the reduction in utility is less if working, i.e. if

$$\frac{\partial U^W}{\partial C_r}(C_r, h_r) < \frac{\partial U^R}{\partial C_r}(C_r(r),0). \tag{4}$$

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[3] In Denmark, Netherlands, Canada, among others, the first pillar is a flat, non-contributory demogrant benefit paid after individuals reach the retirement age.

As typically $C_r(r) < C_r$, this would be the case.[4] Hence, it is likely that a health shock defers retirement when workers must pay out-of-pocket costs for their medical treatment. On the other hand, if health, H, were explicitly introduced in $U(.)$ by way of affecting the disutility of work effort, i.e., $U = U(C, h(H))$, with $h'(H) > 0$, $U_{hH} < 0$, then a health shock would raise the disutility of work, and this substitution effect would tend to accelerate retirement. In the Danish case of universal health insurance, there is only a small income effect since medical expenses are minor (Simonsen, Skipper and Skipper, 2010). This is different in the U.S., where out-of-pocket medical expenditure can be sizeable and include prescription and medical services co-pays and fees even for those with health insurance. In our U.S. sample, median self-reported out-of-pocket medical expenditures for the 55-64 age-group between the waves 1994 and 1996 are $640 with mean expenditures of $1,651.[5] In comparison, in Denmark figures obtained for the same age-group from the Prescription Database show that the combined median out-of-pocket expenditures on prescription drugs for 1995 and 1996 are $152 with a mean of $299, which are a

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[4] An example is the Gustman and Steinmeier (1994) specification, $U(C_S, h_S) = \alpha C_S^{\alpha} + f(h_S)$, where $\alpha < 1$, i.e., utility is additively separable in C_S and h_S with decreasing marginal utility. In this case, clearly (4) is satisfied for $C_r(r) < C_r$, i.e. $C_r^{\alpha-1} < C_r(r)^{\alpha-1}$ since $\alpha - 1 < 0$.

[5] This is in line with other reports of out-of-pocket medical expenditures. Duetsch (2008) reports based on the Consumer Expenditure Survey that, on average, a consumer unit of 2.2 persons with a reference person aged between 55 and 64 years in 1995 spent $1,911.27 on health care, which includes health insurance ($896.76), Medicare payments ($87.84), and medical services, drugs, and medical supplies ($1,014.52).

little less than a quarter of the U.S. level. Hence, in Denmark largely the substitution effect is present, thus making inequality (2) more likely and inducing earlier retirement following a health shock.

In the U.S., both income and substitution effects are present. Hence, the effect of an acute health shock on retirement should be less than in Denmark, assuming equal preferences for leisure in both countries. This country difference increases for the health insurance constrained individuals in the U.S. who lose their health insurance when they stop working, which would increase medical expenses (M_S) after retirement. This additional income effect (“job-lock”) makes continued work more valuable and thus these individuals even more likely to keep working.[6]

III. Data

Sample Selection

In our sample selection, our main goal is to make the U. S. and the Danish samples as similar as possible. Because of the way the data is organized, we estimate the effect of an acute health shock occurring between time t-1 and time t on the probability of not working for pay at time t+1, where each time interval is equal to two years. We use time t+1 to measure labor outcome rather than time t because in the Danish data we cannot separate individuals who are on sick leave from those who are working for pay at time t. Using time t+1 is also useful because in the U. S. quite a few individuals initially stop working but return to work, mostly within a short

[6] See Gruber and Madrian (2002) for a review of the literature on the effect of health insurance on job mobility.

period of time (Maestas, 2010). Using the consecutive time t+1 ameliorates this problem, which otherwise might lead us to overstate the effect of an acute health shock on not working in the U.S.

The data for the U.S. uses five waves (1994-2002) of the HRS, a national biennial panel survey of individuals born between 1931 and 1941 and their spouses.[7] Observations on HRS age-eligible individuals are selected who are between ages 56 and 64 at time t+1, in order to eliminate those eligible for Medicare. Thus, the sample consists of three three-wave periods based on 5 waves of data (1994-1996-1998, 1996-1998-2000, and 1998-2000-2002). After list-wise deletion of person-year observations with missing information, of those who are on or have applied for disability at time t-1, of those receiving Medicare or Medicaid at time t-1, and of those who were not working at any time before time t during our sample period (including in 1992), the final sample includes 7,869 person-wave observations from 3,799 individuals, including those who passed away between time t-1 and time t+1.

The Danish data consists of a 20% random sample of individuals from the population registers from the years 1993-2001. We selected, in correspondence to the HRS sample, individuals who are between 56 and 64 years old at time t+1. The data include individual information on demographics, labor market characteristics, financial aspects, transfer payments,

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[7] The HRS is sponsored by the National Institute of Aging and conducted by the University of Michigan. We use the public use data files produced by the RAND Center for the Study of Aging (RAND HRS Data Version J and fat files) as well as the exit files provided by the HRS. See Juster and Suzman (1995) and the HRS website at http://hrsonline.isr.umich.edu for an overview of the data.

and objective health measures. The latter are merged from the National Patient Registry and consist of the diagnoses made at hospital admissions in any given year. As in the U.S. sample, we select individuals who are working in all waves prior to time t during our sample period. To match the sampling framework of the HRS, three three-time periods are constructed out of the 9 years of data at hand (1993-1995-1997, 1995-1997-1999, 1997-1999-2001). The final sample includes 138,284 person-wave observations and 62,999 individuals, including those who passed away between time t-1 and time t+1.

Although the Danish sample covers the period 1993-2001 while the U.S. sample covers the period 1994-2002, the actual difference is less than a year in most cases since in the Danish data labor market status and demographics are measured at the earliest at the end of November, while the median end of the interviews in the HRS sample is about midyear.

Variable Definitions

We define individuals as working at time t+1 if they receive pay from work. Instead of focusing narrowly on labor market exit through retirement, we use the widest definition of non-work as possible, including retirement, unemployment, disability, other type of benefit receipt (e.g. sickness absence) or being outside the labor market.[8] This is useful because such a definition is not affected by the institutional differences between Denmark and the U.S. that

[8] While an alternative could be an hours-based measure, this information is not available in the Danish registers.

might result in different types of transition pathways from work to retirement.[9] Thus, the outcome measure is a dichotomous variable defined as working for pay or not.

Following McClellan (1998), we define an individual as having had an acute health shock between times t-1 and t if the individual suffered from new cardiovascular disease (CVD - defined as heart attack or stroke) or a new cancer, except for skin cancers. We also condition on the individual having been hospitalized. The Danish health measures are medical diagnoses made at the time of hospital discharge and, therefore, the hospitalization is related to the health shock. In the HRS, we are not able to relate the hospitalization to the health shock.

The measures are self-reported in the U.S. HRS. Subjective reports of health are prone to justification bias (Anderson and Burkhauser 1985), but individuals are probably less likely to misreport the presence or new diagnosis of a specific and severe acute condition. Self-reported measures may serve as more credible proxies in this case. Even though objective health measures need not be correlated with work incapacity (Bound 1991), we only consider serious conditions (CVD, new cancer), which can be expected to impose work limitations. We report a robustness

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[9] For example, disability retirement is not as widely-used a path in the U.S., where the majority of individuals transit directly to the receipt of Social Security benefits from full-time work at the early or normal retirement ages. In the 50-54 age group in 1998 only 6% of men receive disability; at ages 55-59 this figure is 9% and at ages 60-64 12.9% (Coile and Gruber 2004) By way of comparison, in Denmark in 2000 11.3% of men in the 50-59 age group and 13.6% of men in the 60-64 age group receive disability benefits (Statistics Denmark 2011 and own calculations).

check on differences in self-reported health and hospital-based admissions in Denmark in section V.D.

Aside from the health shock measures, the estimations include controls for gender, couple status, an interaction term between gender and couple status, age dummies, race dummies (for the U.S. sample only), educational categories, a dummy variable for self-employment, and financial aspects. All of these are measured at time t-1, except for the age dummies, which are measured at time t+1 to facilitate the discussion of the effects of an acute health shock at different ages, including at early and normal retirement ages. We include the logs of income and wealth as financial aspects but refrain from adding replacement rates, potential retirement benefit streams or other types of compensation measures as explanatory variables because of endogeneity concerns (Bound 1989).

For some of the analyses using the HRS data, we also use self-reported health insurance status at time t-1, which we categorize as follows: 1) unconstrained, if the individual has health insurance and will not lose it when retiring (either because of own employer's coverage in retirement or because the individual is covered through the spouse's insurance), 2) constrained, if the individual has health insurance and will lose it when retiring, 3) no health insurance; 4) missing, if we were not able to determine health insurance status. These classifications include governmental provided insurance, though as mentioned earlier we dropped individuals from the sample who reported being on Medicaid or Medicare at time t-1.

Descriptive Statistics

Tables 1 and 2 show the summary statistics for the two countries. The first column shows the means and standard deviations for the entire sample, and the following three columns show those for the sample split in three groups, defined at time t+1: those working, those not working, and those who have passed away. In the estimations, we will mostly use the first two groups, but in section V.B we report results from estimations where we use the entire sample, including those who passed away.

When comparing the U. S. and the Danish samples, we find that the share of those not working for pay is lower in the U.S. While 35.5% of the age-cohort is observed not working two periods later in the Danish sample, the equivalent figure in the HRS is 24.1% (see Tables 1 and 2, first row). In the HRS, the share of those unconstrained in terms of health insurance is highest among those not working, consistent with job-lock but also with selection into different types of employment. Although the Danish and U.S. samples are comparable in terms of the overall share of deceased and age, some differences in these and other controls (marital status, female share of deceased) confirm the need to control for these factors. While 4.1% of the HRS sample experiences an acute health shock over this period the corresponding figure in the Danish case is much lower, with 2.0%. When disaggregating by type of shock - cancer or CVD - we see that both the incidence of CVD and its burden among the deceased are higher in the U.S., while more Danes die as the result of new cancer. Overall, 2.6% of individuals in our U.S. sample and 2.5% in our Danish sample pass away.

IV. Empirical Model

As mentioned above, we are interested in the effect of an acute health shock between time t-1 and t on the probability of not working for pay at time t+1. We estimate a probit model of not working, where the latent variable, $NW_{i,t+1}^{*}$, is the unobserved propensity to not work at time *t*+1 given that the individual was working at time *t*-1, and is given by:

$$NW^*_{i,t+1} = \beta_0 + \beta_{AN} Acute_{i,[t-1,t]} + \beta'_X X_{i,t-1} + \beta'_{AGE} AGE_{t+1} + \varepsilon_{i,t+1} \quad (5)$$

for i=1, …N, with

$$NW_{i,t+1} = \begin{cases} 1 \; if \; NW^*_{i,t+1} > 0 \\ 0 \; else \end{cases}, \quad (6)$$

where $NW_{i,t+1}$ is the observed indicator for not working at time *t+1*; $Acute_{i[t-1,t]}$ measures the occurrence of an acute health shock between *t*-1 and *t*; *X* is a vector of controls measured at time *t-1*, which in the baseline estimation includes gender, marital status, the interaction between the two, educational categories, self-employment status, logs of income and of wealth; and *AGE* is a vector of age dummies measured at time *t+1*. $\varepsilon_{i,t+1}$ is standard normally distributed. Standard errors are adjusted for multiple observations of individuals.

A parsimonious specification is chosen to avoid any endogeneity via the regressors. Specifically, we do not control for health insurance status in the U.S. sample. Individuals who are insured may have different unobserved characteristics than those uninsured with respect to tastes for work, risk-taking, discounting behavior etc., so that the inclusion of health insurance status in the estimation may bias the effect of an acute health shock on labor supply (Levy and Meltzer, 2004). For example, French and Jones (2011) find that those with employer-provided retiree health insurance have stronger preferences for leisure than those without such insurance. Instead, the identification strategy used in this paper consists of comparing similar individuals in a setting where insurance is universal and out-of-pocket medical expenditures are low to a setting in which some individuals may select themselves into jobs providing insurance while for others this option does not exist. Furthermore, by conditioning on a wide and relevant set of observables, we reduce other sources of heterogeneity for the purpose of making the two county samples as comparable as possible.

V. Results

V. A Baseline

We begin by comparing the results from the baseline specification. Table 3, columns (1) and (3), shows the average partial effects (APEs) of the baseline probit model.[10] According to the estimates generated from the Danish sample a new acute health shock raises older workers' probability of not working for pay (NW) by 8.8 percentage points and, surprisingly, in the US is almost double of that, with 15.9 percentage points. These estimates are highly statistically significant and differ at the 90% level. Figure 1 plots the APEs in the two countries by age at time t+1 with a 90% confidence interval band. Across almost all ages, the APE of an acute health shock on not working is greater in the U.S. than in Denmark. The average partial effects increase by age and rise sharply at the early retirement ages in both countries (age 60 in Denmark and age 62 in the U.S.). The respective predicted probabilities of not working for those without an acute health shock are 36.3% in Denmark and 24.2% in the U.S. and for those who suffered from a health shock 45.1% in Denmark and 40.0% in the U. S. This reflects the much higher probability of retirement in Denmark at the ages represented in our samples (we discuss this further in section V.C). The relative magnitude of the response to a health shock is big in both countries. Relative to the probability of not working for those without a health shock, a health shock in the U. S. increases the probability of not working by 15.9/24.15 = 66% and in Denmark by 8.8/36.6 = 24%.

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[10] Throughout the paper, we report for dummy variables the average of the partial effects for a discrete change from zero to one.

These probabilities confound an important distinction by the type of the health shock in the response in the two countries. When we consider separately the occurrence of new cancer and of cardio-vascular disease (CVD) (average marginal effects are shown in Table 3, columns (2) and (4)), we find that in the U. S. the effect of new onset of CVD on the probability of not working is twice as big as that of new cancer (18.9 versus 9.5 percentage points), while in Denmark these effects are not statistically different with 10.1 and 8.1 percentage points. It also shows that the response in both countries to an onset of new cancer is similar, but that Americans react much more strongly to the onset of CVD – it almost increases the overall probability of not working for the affected Americans to that of affected Danes. The predicted probability of not working for Danes increases from 36.4% to 44.5% for cancer and from 36.4% to 46.5% for CVD. For Americans, the predicted probability of not working increases from 24.6% to 34% for cancer and from 24.3 to 43.3% for CVD.

The results are similar when we consider the APEs by age. For the onset of new cancer, we find that there is no statistically significant difference between the two countries by age for the effect of the onset of new cancer on the probability of working (see Figure 2), but that there is a differential effect for almost all ages for the effect on new CVD (see Figure 3).

When we compare the probability to retire by gender and couple status (results not shown), we find that in the Denmark, women are more likely to stop working as are partnered individuals, while none of these characteristics has a statistically significant effect in the US. However, when we include additional interaction effects of an acute health shock and gender and marital status, we find no statistically significant differences of the effect of an acute health shock on the probability of working in either country by gender and couple status, with the one exception of Danish women, which are more likely to stop working as a result of new CVD than Danish men (results not shown).

Even though it is likely that individuals self-select into employment with health insurance both with and without retirement coverage (Levy and Meltzer, 2004), it is useful to examine the differences in the size of the effects of an acute health shock on the probability of not working for individuals with different types of health insurance in the U.S. Table 4 shows the predicted probabilities for individuals with different types of health insurance from the baseline regression with added interaction terms on a health shock and insurance types. As expected, individuals who are not health insurance constrained (that is, who do not lose their health insurance when they stop working) are more likely to retire than those who are constrained if they do not suffer from a health shock. There is no statistically significant difference between those who suffered from a health shock, but this could be the result of the small number of individuals suffering from a health shock who are health insurance constrained.

In summary, the results of our baseline estimations are counterintuitive – despite the fact that for many Americans health insurance is tied to their employment, they are as likely or even more likely to stop working in response compared to Danes, depending on the type of health shock. In what follows, we present compelling evidence that differences in health and mortality are likely to explain this result. Selection bias resulting from the higher base rates of retirement in Denmark at younger ages is a less compelling explanation discussed in section V.C.[11] We

[11] We also explored cultural differences as an explanation, i.e. whether a stronger work ethic leads Danes to remain in the labor market even when hit by serious disease. We pooled General Social Survey (GSS) data from 1972-2008 to look for cultural differences in work

follow with a brief discussion of further robustness checks conducted to ensure that the results are not dependent on small changes in the definitions of the variables included or the type of control variables used. We end this part with a discussion of potential caveats.

V. B Differences in Mortality and Health

The difference in response to an acute health shock could be explained if the seriousness of the shock is different in the two countries. To investigate this, we start by investigating whether a health shock has a differential effect on mortality.[12] The results of a probit analysis of the probability of death between time t-1 and time t+1 are shown in Table 5.

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behavior between children of immigrants of Scandinavian descent compared to descendants of other ethnicities. When looking at differences in mean proportions not working at ages 54 to 64 between the two groups, confidence intervals overlapped at all ages except at age 60. Although being descriptive and not linked to the incidence of health problems, this evidence shows that the underlying work behavior of Scandinavian Americans is on the whole not different from that of other ethnicities. However, we drew only 633 observations from the GSS for this period in the 54-64 age group, of which 182 were of Scandinavian descent (results available on request).

[12] There are two caveats with this analysis: First, in the HRS (but not in the Danish register data), there is health-related attrition; and second, we are not able to track all individuals in the HRS who passed away nor do we know for all of them whether they suffered from a health shock. This could lead to an underestimation of the rate of death following from a health shock compared to the Danish sample. However, the probability of dying in our samples is the same (see Tables 1 and 2) and the overall mortality rates have converged over time (see Figure 7).

The APE of dying from an acute health shock is twice as big in Denmark as in the U.S. When we split the health shock by type (columns 2 and 4), we can see that this difference is driven entirely by the higher impact of cancer on mortality in Denmark. The effect of a new CVD on mortality is the same in both countries, but mortality increases as a result of new cancer by 22.2 percentage points in the U.S. and 44.7 percentage points in Denmark. This is also the case when we consider the effects by age at time t+1 (see Figures 4 to 6). Other sources, such as the WHO Mortality Database (MDB) support this finding (see Figure 8 for cancer mortality rates in the two countries). The average marginal effect of CVD disease on the probability of dying is the same in our samples. Hence, we find that Danes are more likely to die from cancer than Americans, but that the surviving Danes are as likely to stop working in response as are Americans; and we find that people in both countries have the same probability of dying as a result of CVD but that the surviving Americans are twice as likely to stop working. In what follows, we argue that this can be explained by two main factors: Lower levels of diagnostic care in Denmark resulting in a lower likelihood of detection of cancers at early stages, and thus a higher probability of dying from cancer implying that surviving cancer sufferers in Denmark could be healthier than their counterparts in the U.S.; and greater severity of CVD in the U. S., leading to higher mortality and a greater likelihood of individuals to stop working as a result. We will discuss these two effects separately.

In the U.S., mortality from cancer has been greatly reduced since the early 1990's. Americans are much more likely to be screened for cancer than Europeans (Howard et al., 2009), so that cancer is detected at earlier, more curable stages, leading to higher 5-year survival rates (Preston and Ho, 2009). Even though the U.S. might be over-screening its residents, it is likely that the higher rates of screening reduce mortality (Cutler, 2008; Preston and Ho, 2009). For example, for the age group 50-64, American women are almost four times more likely to have had a mammography in the past 2 years compared to Danish women, and American women have higher breast cancer incidence rates, higher 5-year survival rates and lower mortality rates (Howard et al., 2009).[13] Rates for colon cancer screening tests and PSA tests are likewise much higher in the U.S. (Howard et al., 2009). At the same time, there is evidence that in the U.S. less severe cases of disease are more likely to be treated than in Europe, and that treatment for cancer is more aggressive (Quinn, 2003). Lower cancer screening rates and less treatment in Denmark result in higher mortality rates as undetected cancers often reach a more advanced stage (e.g. Miller et al.., 2009 find this for prostate cancer); however, paradoxically, this may mean that Danes who survive a cancer diagnosis in our sample are selected in terms of their health and therefore may be in better health than the cancer survivors in the HRS sample. As shown in the theoretical model, an acute shock such as cancer would reduce the planning horizon and increase disutility from work (especially if treatments are aggressive). This would imply that surviving Danes have lower disincentives to work than similar Americans based on health, which could explain why Danes and Americans have the same APEs because even though cancer surviving Danes are potentially in better health, they are neither affected by job-lock through employment-tied health insurance nor by the income effect of out-of-pocket medical expenses.

In our sample, the share of individuals experiencing a new onset of CVD is much higher in the U.S. than in Denmark. This is in line with national data, which shows that Americans are more likely to suffer from heart disease than Europeans (Preston and Ho, 2009)

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[13] This can also explain the higher incidence of cancer in our samples of 2% in the U.S. sample versus 1.5% in the Danish sample (see Tables 1 and 2).

and are more likely to die from CVD than Danes (see Figure 9), despite the fact that mortality from heart disease has declined dramatically in the U.S. (Hunink et al., 1997). In Denmark, only mortality rates from CVD of men have declined dramatically over the last 30 years, and mortality rates from cancer for both genders have been relatively stable (Milligan and Wise, 2011; Bingley et al., 2011). Americans also have a higher incidence of cardiovascular risk factors than Danes – rates of hypertension, obesity, high cholesterol, and diabetes are much higher in the U.S. than in Denmark (Andreyeva et al. 2007; Goldman et al., 2009).[14] For example, for individuals aged 50 and above, 50% of Americans have high blood pressure, 33.1% are obese, 21.7% have high cholesterol, and 16.4% are diagnosed with diabetes (Thorpe et al., 2007). The corresponding percentages for Danes are, separately for men (women) as follows: 30.7% (28.4%) have hypertension, 14% (13.3%) are obese, 17.4% (6.7%) have high cholesterol, and 8.1% (6.7%) have diabetes (Andreyeva et al. 2007). Even though it is possible that the difference is the result of under-diagnosis in Denmark, it is likely that under-diagnosis is less important for these risk factors than for cancer (Michaud et al., forthcoming; Howard et al., 2009). Comparing self-reports and biomarkers of diabetes and hypertension for the UK and the U.S., Banks et al. (2006) found that these were very similar, and much higher in the U. S. than in the UK.

Risk factors do not only predict the onset of new CVD but also increase the severity of CVD once it occurs (e.g. diabetic heart patients have more extensive coronary artery disease and poorer prognosis than non-diabetic patients, see Fallow and Singh, 2004). This

[14] Rates of smoking have decreased in the U.S. since the 1970s, but total rates of current and former smokers are higher in the U.S. than in Denmark (Thorpe et al. 2007).

greater severity can explain why Americans are more likely than Danes to stop working as a result of new CVD. Poor underlying health and poorer physical functioning also make it more difficult to recover and return to work after an acute health shock.

There is evidence that the American health care system is better equipped to help patients with CVD, with - compared to other high-income countries - more affected individuals taking medications for their conditions, unusually aggressive treatment regimes, and high survival rates (Preston and Ho, 2009; Cutler and Mas, 2006).[15] In contrast, nationalized health care systems tend to use dated technology and, typically, hospitals are short-staffed, waiting times are long and stays are relatively short even for acute care cases. It is also likely that – given the greater labor supply response in the U.S. – individuals at risk of heart disease are more likely to have previously stopped working. This could also explain why in our samples, the effect of CVD on mortality is the same even though in the general population mortality is higher in the U.S. than in Denmark (see Figure 9).[16] This can also explain that despite the greater severity of

[15] One might expect that the outcome could depend on having health insurance. Unfortunately, the sample size does not allow to test whether the probability of dying after a health shock in the U.S. differs by type of health insurance, that is, whether individuals without insurance who might have less access to health care have a greater likelihood of dying.

[16] If instead of using proxy respondents' reports of whether the deceased suffered from new cancer or new CVD we use the cause of death to define a health shock, the incidence of health shocks among the deceased increases, and APEs increase to 32.33 percentage points for cancer and to 19.85 percentage points for CVD. To some degree, one can think of these numbers as upper bounds because not all of these instances of cancer and CVD are new health shocks; on

CVD, the effect of CVD on mortality in our samples is similar in Denmark and the U.S. as shown in Table 4. It is important to note that, even though Americans without health insurance are less likely to get screened for diseases (Preston and Ho, 2009), 15.8% of Americans in our sample[17] report not having health insurance (in 2000 the overall rate of the uninsured was 13.6% based on U.S. Census Bureau data).

V.C Differential Attrition and Unobserved Heterogeneity

Labor force participation rates of older individuals are higher in the U.S. than in Denmark. Figure 10 shows the hazard of not working for our samples by gender. The hazard is about the same for individuals under age 60 and much higher for Danes at older ages. From the age of 60, many Danish blue-collar workers take advantage of the early retirement program (VERP), which explains the sharp rise in the hazard rates, particularly for women.[18]

In the U.S., individuals with high discount rates, low assets and poor health are more likely to stop working (Gustman and Steinmeier 2004). It is possible that this selection is even stronger in Denmark than in the U.S. There exist a multitude of early exit options, and a generous and somewhat more easily accessible disability pension in the Danish welfare state

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the other hand, our definition of health shocks as used in the paper do not condition on cause of death, so that individuals who had cancer, let's say, but died in an accident are not counted here.

[17] As mentioned earlier, an additional 8.9% of our sample could not be classified according to health insurance status.

[18] In our sample period, VERP is available starting at age 60 to Danish workers who have accumulated membership in an unemployment insurance fund for at least 25 of the last 30 years.

would tend to siphon out low wage/low SES workers from the labor market early, a group for whom the replacement rate from early retirement pensions is high (see, for example, Bingley et al. 2004). Thus, individuals in Denmark who continue to work at older ages are probably predominantly high SES, white-collar workers with stronger tastes for work and in relatively better health and therefore more prone to return to work following a health shock. Pre-existing co-morbidities (such as cardiac disease), which are more prevalent among low SES groups (Marmot 2001), reduce the number of work hours and increase labor market exit (Saeki et al. 1995). If the Danish sample were more selected due to these reasons than comparable Americans, the effect of a health shock would be weaker.

To test the importance of differential selection over time, we repeated the analysis for individuals below age 60 at time t+1 only, since until age 59 - as mentioned above - the retirement hazard is relatively similar in the two countries (see Figure 10).[19] The results (see Table 6) are similar to the previous results (and not statistically different), although estimated less precisely because of the smaller sample sizes. We conclude that differential sample selection does not appear to be the reason behind the observed country differences.

V. D Robustness checks

Variable Definitions

A variety of robustness checks regarding variable and sample definitions showed no significantly different APEs on the effects of acute health shocks on not working (results not

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[19] Unfortunately, the sample sizes are too small to investigate the educational gradient in response to a health shock.

shown). These robustness checks include a) excluding those with very low income from the Danish sample (less than 50,000 Danish kroner) and including those with less than US $5,000 as not working in the U.S. sample (both in 2000 prices); b) including those who are unemployed as working; c) restricting the sample to individuals with unchanged couple status; and d) restriction the sample to non-Hispanic whites (U.S. only).

Self-reports vs. hospital admissions

As mentioned earlier, the prevalence of acute health shocks is lower in the Danish sample, 2.0%, compared to 4.1% in the U.S. sample (split up into 1.5% cancer, 0.5% CVD in Denmark compared to 2.0% cancer, 2.3% CVD in the U.S.). This is similar to the findings by Banks et al. (2007) that rates of heart attacks, strokes, and cancer were much higher in the U. S. than in England. This lends support to the idea that the differences in measured acute health shocks are real rather than the result of differences in measurement. Nevertheless, it is possible that some of the difference is the result of the difference in measurement.

In the Danish sample, acute health shocks are doctor-diagnosed and contingent on a related hospital stay. In the U.S. sample, the health shock is self-reported (as diagnosed by a physician) and contingent on a hospital stay, which may or may not be related.

One would expect that acute health shocks that are not necessarily related to a hospital stay to be less severe. This would bias the estimate of the average partial effect in the case of the U.S. downward, and can, therefore, not explain our findings.

The second difference in the measurement of health shocks is the use of medical diagnoses in Danish sample and of self-reports in the U.S. sample. We are constrained to making a register-survey comparison because no panel survey of the elderly exists in Denmark that is comparable to the HRS in terms of size and richness.[20] This difference between self-reports and diagnoses could only explain our findings, however, once again only if the shocks reported in the HRS are more severe than those defined by the diagnoses, which is likely not the case.

One way of addressing this issue is to test whether any survey-register differences are present in the Danish case. To investigate this, we make use of a large Danish cross-sectional survey of about 22,000 individuals aged 16 and up, the National Health Interview Survey (SUSY) of 2000, which is the third general health and morbidity survey carried out by the National Institute of Public Health. This survey has been merged to register data on labor market variables and diagnoses for the years 1998-2000. Limiting the sample to 56-64-year-olds in 2000 who were working in 1998 according to the register employment measure, we run probit regressions of not working in the year 2000 on the same controls as before, i.e. gender, marital status (and their interaction), educational categories, self-employment status, income, wealth, and age-dummies, all measured in 1998. Because of the survey-register link-up, two measures of acute health shocks are available. We access both the previously defined register-based measure of diagnoses of CVD or cancer made at hospitalization, and the survey measure of individuals' self-reports (either the presence of the disease or if told by a doctor) on the existence of acute conditions, such as CVD (if the respondent reports either heart attack or cerebral stroke) or cancer. Health shocks are measured as occurring in 1999-2000. The results show that the APE of an acute health shock on NW is 0.189 (standard error 0.048) using the register-based measure

[20] The Survey of Health, Ageing and Retirement in Europe (SHARE) is currently only available for three waves, and the sample we could use to compare our results to is, therefore, too small.

and 0.142 (0.061) using the survey-based measure. Hence, using medical diagnoses give a higher APE compared to the APE from using survey self-reports suggesting that medical diagnoses are more severe and have a greater effect on the probability. However, the difference between the two is not statistically significant.[21]

VI. Conclusions

This paper compares the effect of acute health shocks on the probability of not working among a sample of elderly workers from the Danish Longitudinal Registers and a comparison sample from the U.S. HRS, where we define a health shock as the onset of new cancer, a heart attack, or a stroke. Though the job lock effect of employer-based health insurance and the income effect of increased medical expenditures only exist in the U.S., health shocks reduce work to a much greater extent in the U.S. than in Denmark, despite its general tax-financed health-care system with universal access to health care. At the same time, more Americans suffer from an acute health shock than Danes, leading to an even greater response in terms of overall increase in the share of Americans who stop working: Our results show that the difference in response in driven in its entirety by Americans' greater response to new CVD (heart attack and stroke), while Danes' and Americans' labor force participation response is the same to onset of new cancer. We provide what we believe is compelling evidence that greater mortality from cancer in Denmark and a greater disease burden in the U. S. can explain this counterintuitive finding.

Our results contribute to the discussion of how disease and disease risk cause different selectivities on the labor market across countries, and thereby shed light on how

[21] These results are available on request.

different health care systems affect individual response to acute health events. An important tradeoff seems to be present in nationalized health care systems between a lower screening rate and less treatment in "high end" cases and universal life-long preventive care reducing risk factors and overall disease burden. These tradeoffs can imply differences in surviving workers' health across settings. Thus our findings can explain why Danes' labor force participation – despite having universal health insurance with low out-of-pocket medical expenses – seem to respond less to acute health shocks, and underscore the importance of taking into account differences in disease risk as well as different responses of health care regimes across countries.

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Tables

Table 1. Summary Statistics, U.S., Means, All and by Work Status at t+1

	All	Working	Not working	Deceased
Row%	---	0.734	0.241	0.026
New health shock [1]	0.041	0.026	0.057	0.327
New cancer	0.020	0.012	0.023	0.218
New CVD	0.023	0.014	0.036	0.139
Age at time t+1	60.706	60.443	61.487	60.921
	(2.261)	(2.253)	(2.106)	(2.175)
Woman	0.456	0.452	0.480	0.351
Couple in t-1	0.779	0.773	0.797	0.762
Education				
Less than HS	0.177	0.165	0.214	0.149
HS / GED	0.373	0.365	0.396	0.381
Some College	0.224	0.228	0.195	0.347
College +	0.227	0.241	0.195	0.124
Black	0.139	0.133	0.155	0.173
Race – other	0.035	0.037	0.026	0.045
Self-employed in t-1	0.179	0.198	0.123	0.163
Log of wealth in t-1 [2]	10.723	10.728	10.776	10.070
	(3.843)	(3.840)	(3.772	(4.518)
Log of income in t-1 [2]	10.098	10.150	9.972	9.797
	(1.330)	(1.216)	(1.589)	(1.636)
Health Insurance Status				
Unconstrained	0.544	0.524	0.601	0.574
Constrained	0.209	0.220	0.179	0.193
No health insurance	0.158	0.166	0.135	0.153
Missing information	0.089	0.091	0.085	0.079
Number of observations	7,869	5,774	1,893	202

Working sample. Means are taken over all persons-year observations. Standard deviations are shown in parentheses, except for dummy variables.

[1] *New cancer and new CVD do not add up to the share of new health shocks since a few individuals suffered from both.*

[2] *Income and wealth are in 2000 prices and measured at individual level in order to facilitate the comparison with the Danish data. For couples, joint values are divided by two. Please note: log(x) is defined as log(x+1) if 0<|x|<1 and as –log(-x) if x<0.*

Table 2. Summary Statistics, Danish Sample, Means, All and by Work Status

	All	Working	Not working	Deceased
Row%	---	0.620	0.355	0.025
New health shock	0.020	0.010	0.017	0.303
New cancer [1]	0.015	0.006	0.011	0.278
New CVD [1]	0.005	0.004	0.006	0.026
Woman	0.427	0.389	0.512	0.185
Couple in t-1	0.817	0.818	0.820	0.766
Age at t+1	60.377	59.735	61.458	60.917
	(2.295)	(2.228)	(1.973)	(2.274)
Education				
Basic education	0.422	0.393	0.471	0.443
Vocational education	0.369	0.363	0.378	0.386
Short or medium education	0.161	0.178	0.133	0.133
Long education and above	0.048	0.066	0.018	0.038
Self-employed in t-1	0.159	0.183	0.116	0.175
Log of wealth in t-1/5 [2]	5.668	5.588	5.855	5.004
	(8.601)	(8.834)	(8.154)	(8.898)
Log of income in t-1/5 [2]	10.776	10.844	10.666	10.669
	(1.074)	(1.098)	(0.974)	(1.563)
Number of observations	138,284	85,704	49,086	3,494

Working sample. Means are taken over all persons-year observations. Standard deviations are shown in parentheses, except for dummy variables.

[1] *New cancer and new CVD do not add up to the share of new health shocks since a few individuals suffered from both.*

[2] *In 2000 prices and Danish kroners. Please note: Before taking logs, wealth and income was divided by 5 to approximate the dollar - Danish kroner exchange rate, and log(x) is defined as log(x+1) if 0<|x|<1 and as –log(-x) if x<0.*

Table 3: Probit: Average Partial Effects for Not Working at t+1,

All Shocks and by Type of Shock, Denmark and U.S.

	Denmark		U. S.	
	(1) All HS	(2) Types of HS	(3) All HS	(4) Types of HS
New health shock	0.088 ***		0.159 ***	
	(0.011)		(0.030)	
New cancer		0.081 ***		0.095 **
		(0.014)		(0.043)
New CVD		0.101 ***		0.189 ***
		(0.018)		(0.040)
Female	0.104 ***	0.104 ***	0.013	0.014
	(0.003)	(0.003)	(0.012)	(0.012)
Couple	0.015***	0.015 ***	0.017	0.017
	(0.004)	(0.004)	(0.015)	(0.015)
Age at t+1				
57	0.009 *	0.009 *	0.033	0.033
	(0.005)	(0.005)	(0.025)	(0.025)
58	0.001	0.001	0.032	0.032
	(0.004)	(0.004)	(0.022)	(0.022)
59	0.018 ***	0.018 ***	0.050 **	0.050 **
	(0.005)	(0.005)	(0.023)	(0.023)
60	0.181 ***	0.181 ***	0.062 ***	0.063 ***
	(0.005)	(0.005)	(0.062)	(0.023)
61	0.297 ***	0.297 ***	0.102 ***	0.103 ***
	(0.005)	(0.005)	(0.023)	(0.023)
62	0.384 ***	0.384 ***	0.209 ***	0.209 ***
	(0.005)	(0.005)	(0.024)	(0.024)
63	0.475 ***	0.475 ***	0.246 ***	0.246 ***
	(0.005)	(0.005)	(0.024)	(0.024)
64	0.470 ***	0.470 ***	0.252 ***	0.252 ***
	(0.006)	(0.005)	(0.025)	(0.025)
Log Pseudo-Likelihood	-74,468.754	-74,468.036	-4,019.23	-4,018.13
# of Individuals	61,389	61,389	3,702	3,702
# of Observations	134,790	134,790	7,667	7,667
Predicted Probability				
New acute condition No	36.32%		24.15%	
Yes	45.11%		40.04%	
New cancer No		36.37%		24.55%
Yes		44.47%		34.03%
New CVD No		36.39%		24.31%
Yes		46.47%		43.26%

*Clustered standard errors are shown in parentheses. Stars denote statistical significance at the *** 1%, ** 5%, and * 10% level. Additional controls include: female*couple, educational categories, self-employment status at t-1, log of wealth at t-1, log of income at t-1, and race (U.S. only).*

Table 4: Probit – Predicted Probabilities of Not Working by t+1 by Types of Health Insurance, All Shocks and by Type of Shock, U.S.

Types of Health Insurance	Unconstrained		Constrained		No Health Insurance		Information Missing	
	(1) All HS	(2) Types of HS	(3) All HS	(4) Types of HS	(5) All HS	(6) Types of HS	(7) All HS	(8) Types of HS
New health shock								
No	26.81% #^		20.37%#		20.51%#		23.41%#	
Yes	41.97%		41.81%		39.89%		26.92%	
New cancer								
No		27.25%^		20.76%		20.87% #		23.61%
Yes		31.42%		39.60%		41.12%		21.18%
New CVD								
No		26.89%#^		20.74%		20.82%		23.37%
Yes		48.76%		36.15%		40.67%		30.92%
# of observ.	4,161		1,607		1,215		684	

*All predicted probabilities are statistical significant at the 1%-level. Additional controls include: female, couple, age dummies, female*couple, educational categories, self-employment status at t-1, log of wealth at t-1, log of income at t-1, race, and the health shock dummy interacted with dummies for health insurance status. Log Pseudo-Likelihood = -4,002.26.*

 # denotes a statistically significant difference at the 5% level between no shock and shock within the same health insurance type, and ^ a statistically significant difference at the 5 % level between the Unconstrained and the Constrained groups (which might be reacting differently to a health shock because of the job-lock effect).

Table 5: Probit - Average Partial Effects for Deceased by t+1,

All Shocks and by Type of Shock, Denmark and U.S.

		Denmark		U. S.	
		(1) All HS	(2) Types of HS	(3) All HS	(4) Types of HS
New acute condition		0.345 ***		0.174 ***	
		(0.010)		(0.023)	
New cancer			0.447 ***		0.222 ***
			(0.011)		(0.035)
New CVD			0.081 ***		0.085 ***
			(0.010)		(0.023)
Log Pseudo-Likelihood		-13,389.230	-13,196.418	-815.40	-811.26
# of Individuals		62,999	62,999	3,799	3,799
# of Obs.		138,284	138,284	7,869	7,869
Predicted Probabilities					
New acute condition	No	1.80%		1.81%	
	Yes	36.33%		19.17%	
New cancer	No		1.86%		2.05%
	Yes		46.52%		24.28
New CVD	No		2.48%		2.30%
	Yes		10.58%		10.76%

*Clustered standard errors are shown in parentheses. Stars denote statistical significance at the *** 1%, ** 5%, and * 10% level. Additional controls include: female, couple, age dummies, female*couple, educational categories, self-employment status at t-1, log of wealth at t-1, log of income at t-1, and race (U.S. only).*

Table 6: Probit - Average Partial Effects for Not Working at t+1, only for age at t+1 < 60, by Type of Shock, Denmark and U.S.

	Denmark		U. S.	
	(1) All HS	(2) Types of HS	(3) All HS	(4) Types of HS
New acute condition	0.123 *** (0.021)		0.219 *** (0.056)	
New cancer		0.106 *** (0.025)		0.153 * (0.091)
New CVD		0.155*** (0.035)		0.223 *** (0.069)
Log Pseudo-Likelihood	-18,902.12	-18,901.48	-992.01	-992.80
# of Individuals	32,280	32,280	1,746	1,746
# of Obs.	47,409	47,409	2,409	2,409

*Clustered standard errors are shown in parentheses. Stars denote statistical significance at the *** 1%, ** 5%, and * 10% level. Additional controls include: female, couple, age dummies, female*couple, educational categories, self-employment status at t-1, log of wealth at t-1, log of income at t-1, and race (U.S. only).APEs are not statistically different at the 90%-level from the APEs of the baseline regression (same country), shown in Table 3.*

Figures

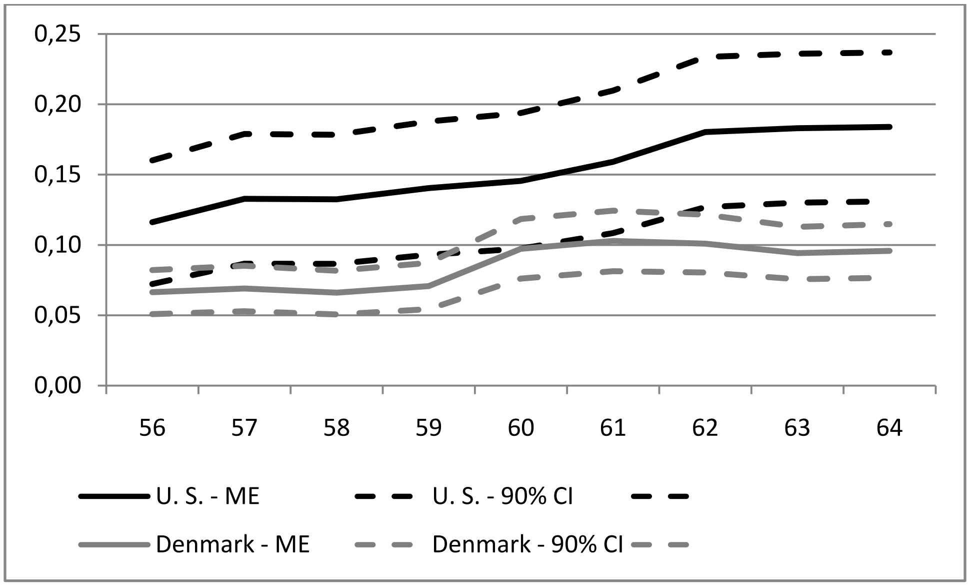


Figure 1: APE of New Acute Health Shock by Age at t+1 with 90% Confidence Interval – Outcome Not Working

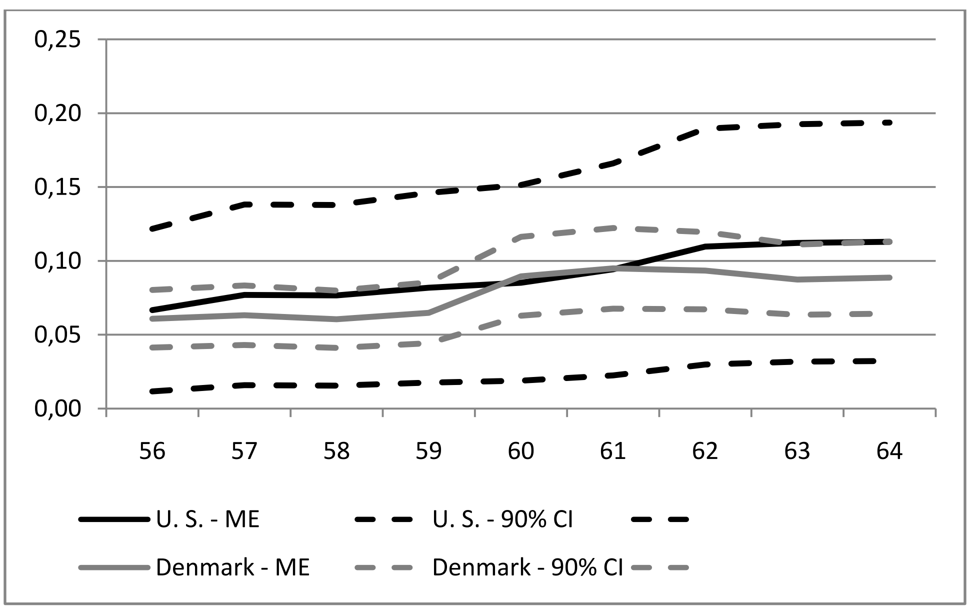


Figure 2: APE of New Cancer by Age at t+1 with 90% Confidence Interval – Outcome Not Working

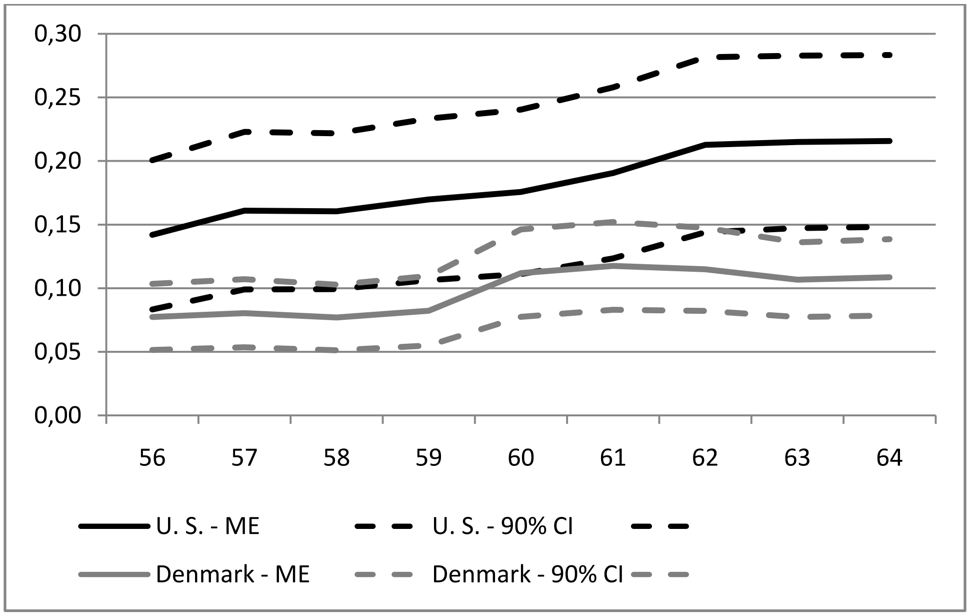


Figure 3: APE of New CVD by Age at t+1 with 90% Confidence Interval – Outcome Not Working

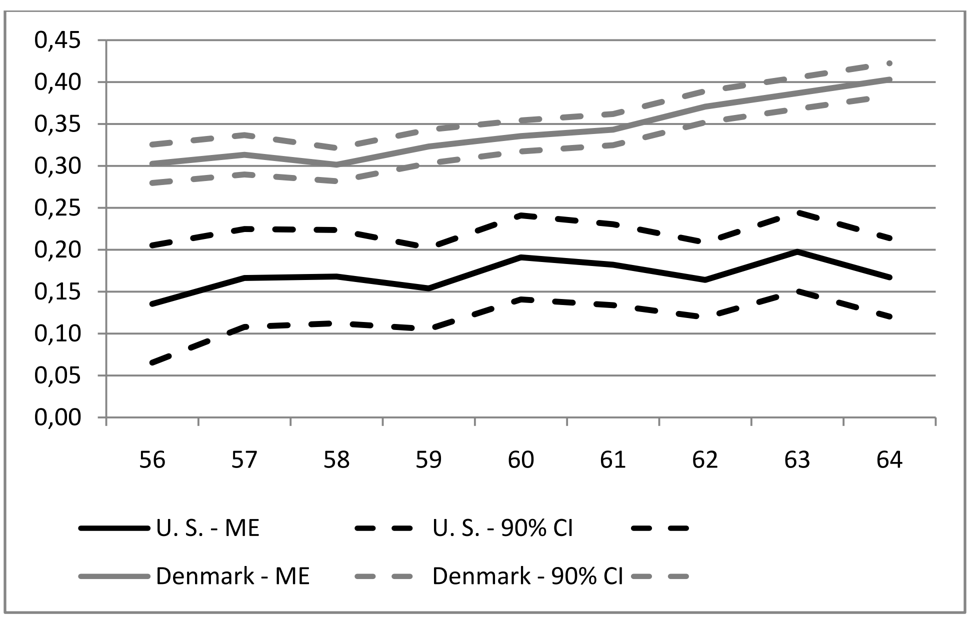


Figure 4: APE of New Acute Health Shock by Age at t+1 with 90% Confidence Interval – Outcome Deceased

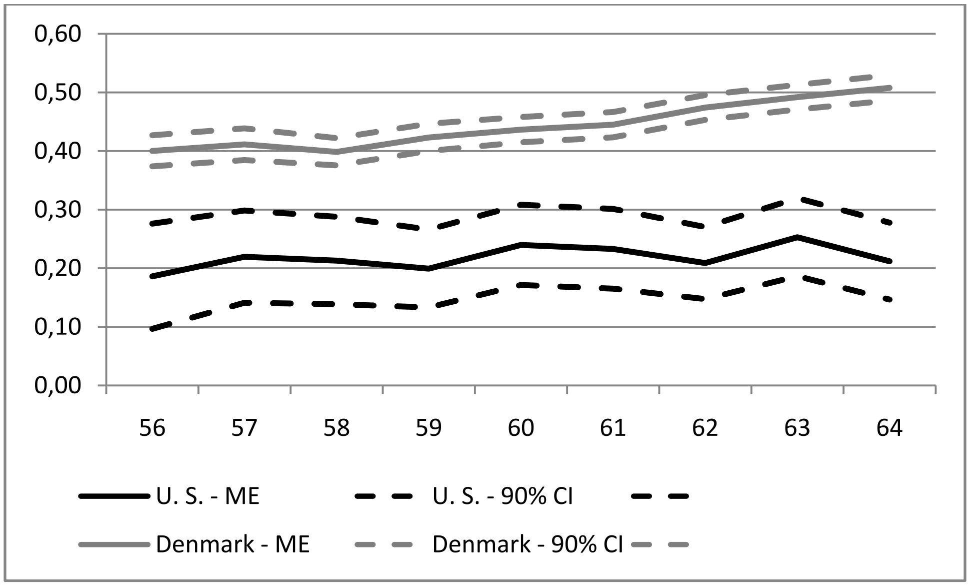


Figure 5: APE of New Cancer by Age at t+1 with 90% Confidence Interval – Outcome Deceased

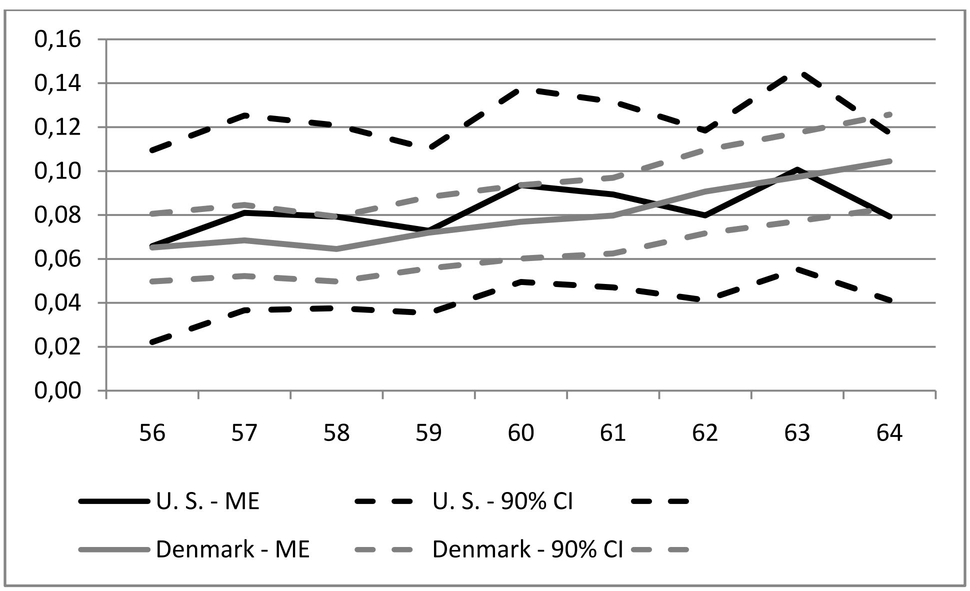
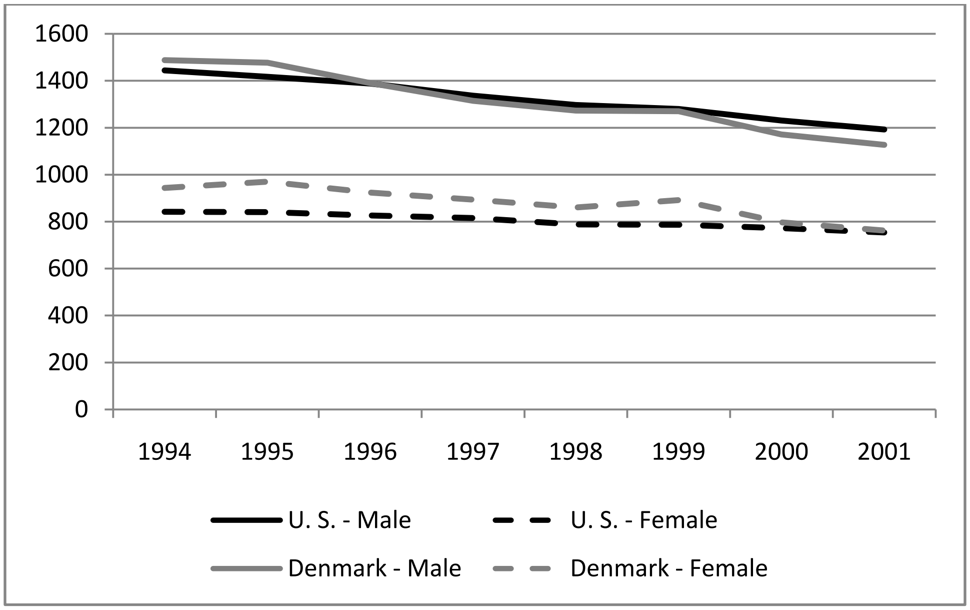
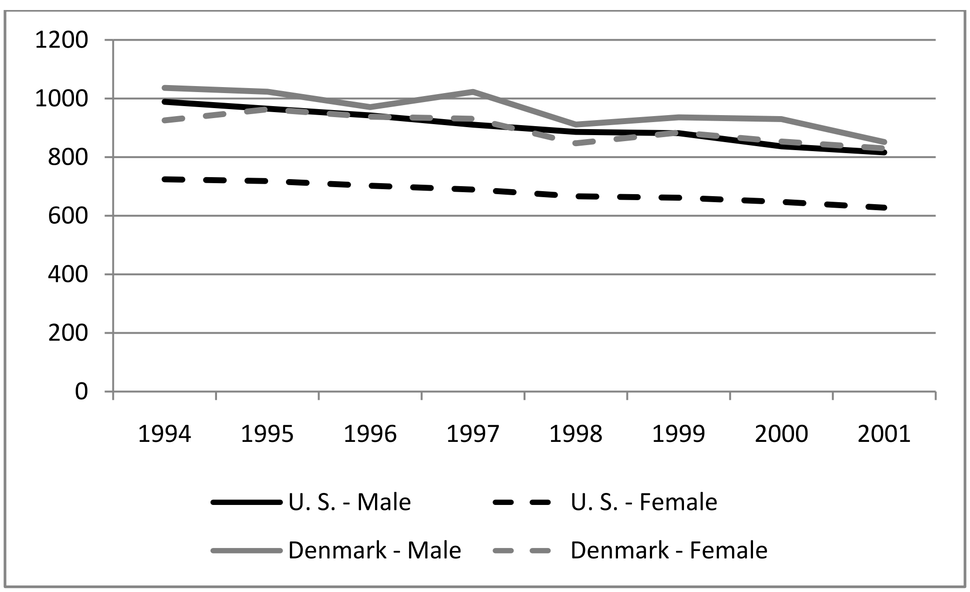


Figure 6: APE of New CVD by Age at t+1 with 90% Confidence Interval – Outcome Deceased



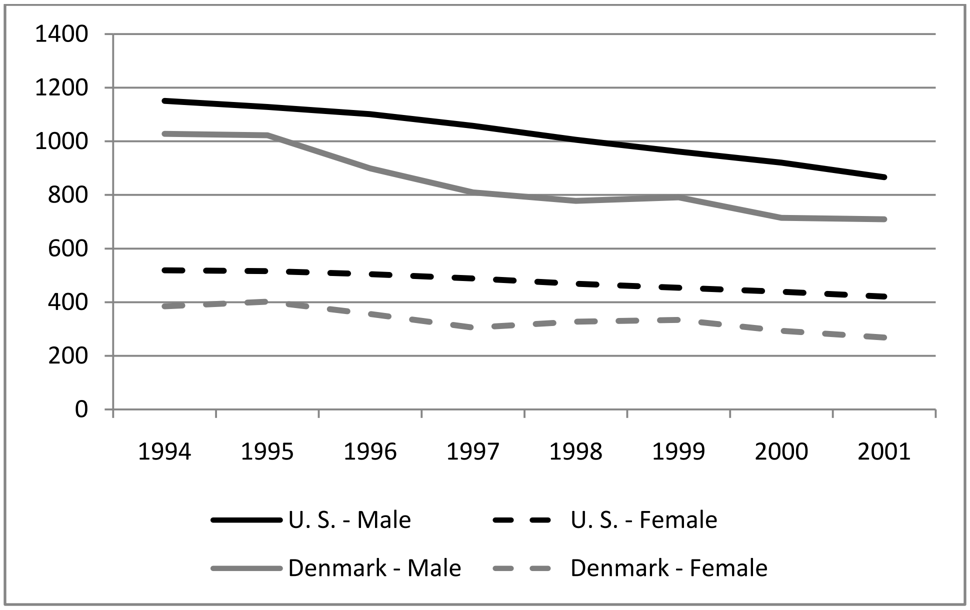
Source: WHO Mortality Database (MDB)

Figure 7: Age 55-64 All-Cause Mortality Rates per 100,000 population, by Sex, U.S. and Denmark, 1994-2001



Source: WHO Mortality Database (MDB)

Figure 8: Age 55-64 Cancer Mortality Rates per 100,000 population, by Sex, U.S. and Denmark, 1994-2001



Source: WHO Mortality Database (MDB)

Figure 9: Age 55-64 CVD Mortality Rates per 100,000 population, by Sex, U.S. and Denmark, 1994-2001

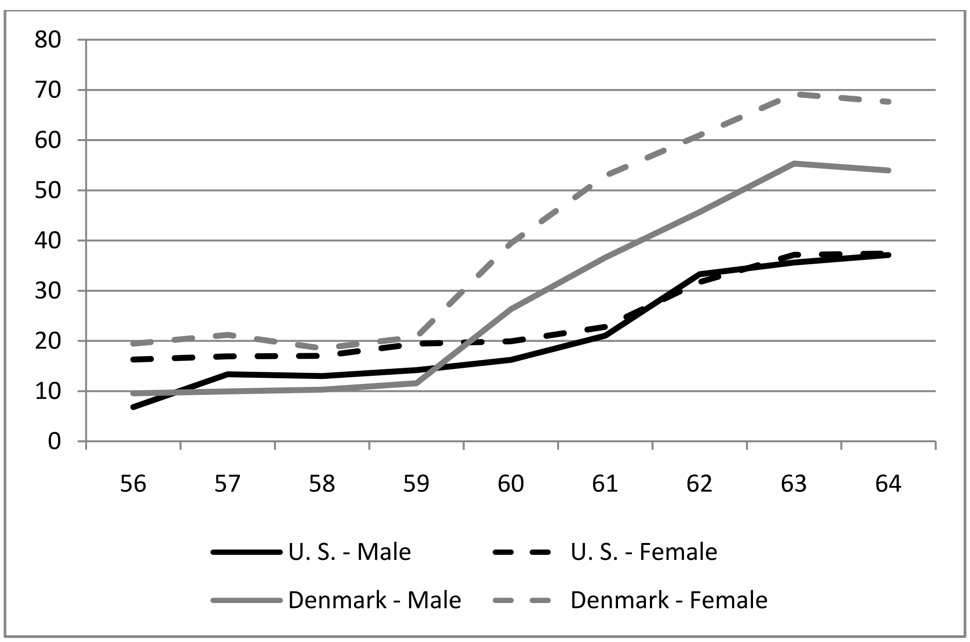


Figure 10: Hazard of Not Working for the U. S. and Denmark by Sex and by Age at t+1, Working Samples