Online Appendix to "Family Labor Supply Responses to Severe Health Shocks: Evidence from Danish Administrative Records"

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Appendix A: Sample Characteristics

Appendix Table A.1: Summary Statistics of Analysis Sample

Fatal Health Events

		Treatment				Control			
		Mean	25th	50th	75th	Mean	25th	50th	75th
	Year of Observation	1993.13	1988	1993	1998	1993.09	1988	1993	1998
Spouses	Age	62.86	56	64	70	62.27	56	63	70
	Education (months)	118.66	84	96	156	119.94	84	96	156
	Percent female	0.6937	-	-	-	0.6632	-	-	-
Individuals that Have	Age	64.84	59	66	72	64.01	58	65	71
Experienced the Shock	Education (months)	123.57	84	120	158	124.05	84	120	159
Number of Households		310,720				409,190			

Non-Fatal Health Shocks

		Treatment				Control			
		Mean	25th	50th	75th	Mean	25th	50th	75th
	Year of Observation	1991.82	1987	1992	1997	1991.945	1988	1992	1996
Spouses	Age	45.38	42	46	50	45.04	41	46	50
	Education (months)	131.42	84	144	156	132.92	84	144	156
	Percent female	0.7450	-	-	-	0.7281	-	-	-
Individuals that Have	Age	47.33	44	48	51	46.86	43	47	51
Experienced the Shock	Education (months)	135.05	84	155	162	136.52	84	156	162
Number of Households		35,143				52,196			

Notes: This table presents distributional moments of key variables in our analysis sample. For each event, the treatment group comprises households that experienced the event in different years, to which we match as a control group households from the same cohorts that experienced the same event but five years later (Δ=5). The upper panel reports statistics for the fatal health events sample. It includes households in which one spouse died between years 1985 and 2011 and was age 45 to 80 in the year of the (actual or placebo) event. The lower panel reports statistics for the non-fatal health events sample. It includes households in which one spouse experienced a heart attack or a stroke (for the first time) between 1985 and 2011 and survived for at least three years, with both spouses under age 60. The values reported in the table are based on data from period t = -2.

Appendix B: Research Design

Appendix Table B.1: Comparison of Pre-Trends in Labor Force Participation across Affected and Unaffected Households

Year and Experimental Group Interactions	(1)	(2)	(3)	(4)	(5)
1989	.0343	.0242	.0234	.0305	.0341
	(.0056)	(.0057)	(0.0057)	(.0069)	(.0069)
1990	.0268	.0172	.0167	.0255	.0281
	(.0054)	(.0054)	(.0054)	(.0067)	(.0067)
1991	.0245	.0172	.0168	.0279	.0296
	(.0052)	(.0052)	(.0052)	(.0065)	(.0065)
1992	.0167	.0107	.0104	.0158	.0167
	(.0048)	(.0049)	(.0049)	(.0060)	(.0060)
1993	.0027	-.0005	-.0006	.0064	.0067
	(.0038)	(.0038)	(.0038)	(.0048)	(.0048)
1994	0	0	0	0	0
	0	0	0	0	0
Age FE	X	X	X	X	X
Gender	X	X	X	X	X
Education			X	X	X
Gender Interactions				X	
Full Gender Interactions					X
Number of clusters	1,230,593	645,968	645,968	645,968	645,968

Notes: This table compares the labor force participation patterns prior to 1995 of a treatment group of individuals born between 1930 and 1950, who experienced a heart attack or a stroke in 1995, to that of a potential control group of individuals from the same cohorts who have not experienced this event in our sample period. We run a regression with calendar year fixed effects, an experimental group indicator, and the interaction of these two sets of variables, where the baseline year is 1994. The table reports the interaction terms in the periods prior to 1995 (the year at which the treatment group experiences the event) to compare the pre-trends across the two groups. Column 1 includes age and gender fixed effects; column 2 replicates column 1 but for the sub-sample of individuals for whom we have non-missing values for education; column 3 adds controls for months of education and its square. Column 4 includes interactions of the baseline variables (year fixed effects, the experimental group indicator, and their interactions) with gender; and column 5 includes interactions of the full set of variables (including age and education) with gender. The table shows the divergent pre-trends across affected and unaffected households, which persist even after we account for key variables. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Table B.2: Spousal Labor Supply Responses to Fatal Health Events—Dynamic Specifications and Robustness

	Participation		Earnings	
	All	Randomization	All	Randomization
	(1)	(2)	(3)	(4)
Treat × Time to Event				
-5	.0013	.0016	-119	-17
	(.0008)	(.0012)	(168)	(230)
-4	.0004	.0006	-173	-119
	(.0007)	(.0010)	(131)	(192)
-3	-.0003	.0003	-122	-110
	(.0006)	(.0008)	(99)	(140)
-2	0	0	0	0
	(0)	(0)	(0)	(0)
-1	-.0004	-.0003	-20	-109
	(.0006)	(.0008)	(96)	(133)
0	.0074	.0071	443	531
	(.0007)	(.0010)	(141)	(196)
1	.0124	.0125	1,856	1,905
	(.0008)	(.0011)	(164)	(225)
2	.0116	.0119	2,026	2,043
	(.0009)	(.0012)	(183)	(251)
3	.0132	.0132	2,173	2,194
	(.0010)	(.0013)	(200)	(273)
4	.0154	.0156	2,460	2,485
	(.0010)	(.0013)	(206)	(292)
Constant	.3718	.3722	67,370	67,364
	(.0008)	(.0011)	(188)	(267)
Treat	-.0243	-.0251	-4,957	-5,198
	(.0009)	(.0016)	(210)	(397)
Number of observations	7,148,029	3,573,463	7,148,029	3,573,463
Number of clusters	500,160	357,391	500,160	357,391

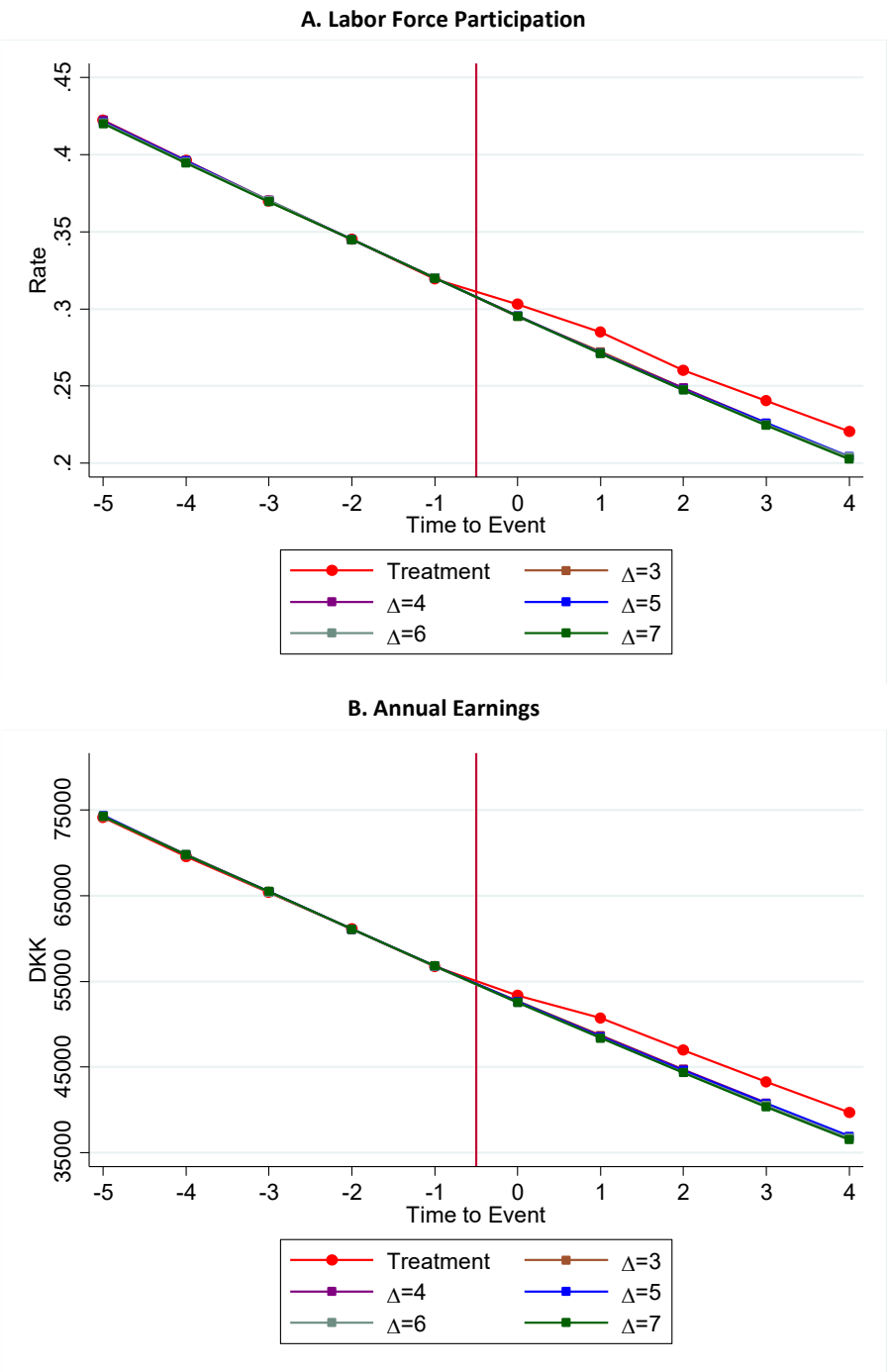
Notes: This table reports estimates for the evolution of spouses' labor supply responses to fatal health events using dynamic difference-in-differences regressions based on equation (1). Column 1 analyzes labor force participation, and column 3 analyzes earnings. As robustness, columns 2 and 4 repeat the analysis using treatment and control groups that do not overlap by randomizing households to only one experimental group. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Table B.3: Spousal Labor Supply Responses to Fatal Health Events—Different Values of the Bandwidth Δ

	Participation					Earnings				
	Value of Bandwidth Δ					Value of Bandwidth Δ				
	3	4	5	6	7	3	4	5	6	7
Treat × Time to Event										
-5	.0003	-.0000	.0012	.0016	.0023	-83	-196	-250	-165	174
	(.0009)	(.0009)	(.0009)	(.0009)	(.0008)	(180)	(179)	(173)	(173)	(171)
-4	.0005	-.0001	.0003	.0009	.0016	-141	-248	-221	-268	-227
	(.0008)	(.0008)	(.0008)	(.0007)	(.0007)	(147)	(145)	(145)	(143)	(141)
-3	-.0002	-.0006	-.0003	-.0005	.0003	-41	104	-110	-57	-141
	(.0006)	(.0006)	(.0006)	(.0006)	(.0006)	(103)	(103)	(101)	(102)	(99)
-2	0	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
-1	-.0008	-.0008	-.0007	-.0007	-.0006	-3	-63	-40	15	-46
	(.0006)	(.0006)	(.0006)	(.0006)	(.0006)	(100)	(99)	(100)	(98)	(101)
0	.0080	.0076	.0077	.0077	.0078	608	697	673	793	763
	(.0008)	(.0008)	(.0008)	(.0008)	(.0008)	(150)	(148)	(147)	(147)	(145)
1	.0126	.0136	.0134	.0138	.0138	2,027	2,110	2,227	2,348	2,343
	(.0009)	(.0009)	(.0009)	(.0008)	(.0008)	(176)	(173)	(170)	(170)	(169)
2	.0117	.0114	.0125	.0127	.0128	2,206	2,208	2,327	2,549	2,594
	(.0009)	(.0010)	(.0009)	(.0009)	(.0009)	(178)	(194)	(190)	(189)	(188)
3		.0142	.0142	.0154	.0158		2,448	2,501	2,744	2,911
		(.0010)	(.0010)	(.0010)	(.0010)		(197)	(208)	(206)	(205)
4			.0163	.0166	.0181			2,750	2,951	3,140
			(.0010)	(.0011)	(.0010)			(213)	(223)	(221)
Constant	.3604	.3659	.3706	.3765	.3828	64,173	65,224	66,196	67,420	68,617
	(.0008)	(.0008)	(.0008)	(.0008)	(.0008)	(203)	(198)	(193)	(191)	(188)
Treat	-.0153	-.0208	-.0255	-.0314	-.0378	-3,073	-4,124	-5,095	-6,319	-7,517
	(.0008)	(.0009)	(.0009)	(.0010)	(.0010)	(183)	(202)	(218)	(231)	(241)
Number of observations	4,991,365	5,775,926	6,621,509	6,795,972	6,962,860	4,991,365	5,775,926	6,621,509	6,795,972	6,962,860
Number of clusters	393,400	429,108	467,211	502,797	536,347	393,400	429,108	467,211	502,797	536,347

Notes: This table reports estimates for the evolution of spouses' labor supply responses to fatal health events using dynamic difference-in-differences regressions based on equation (1) for different choices of the bandwidth Δ. To ensure comparability across bandwidths, we require that the range of calendar years in which households experience the event—which determines the composition of the treatment/control groups for any choice of bandwidth—would be similar across choices of Δ. This guarantees that it is always the same treatment group whose responses are investigated, and that only the control group changes across columns. The upper bound for included years is governed by the highest value of Δ analyzed (of seven years), so that the last event year is 2004. The latter restriction accounts for the difference between our estimates here for Δ=5 and those reported in Appendix Table B.2, as the treatment group in the former is a subset of the treatment group in the latter (since the analysis here is constrained by the highest Δ of seven years). Robust standard errors clustered at the household level are reported in parentheses.

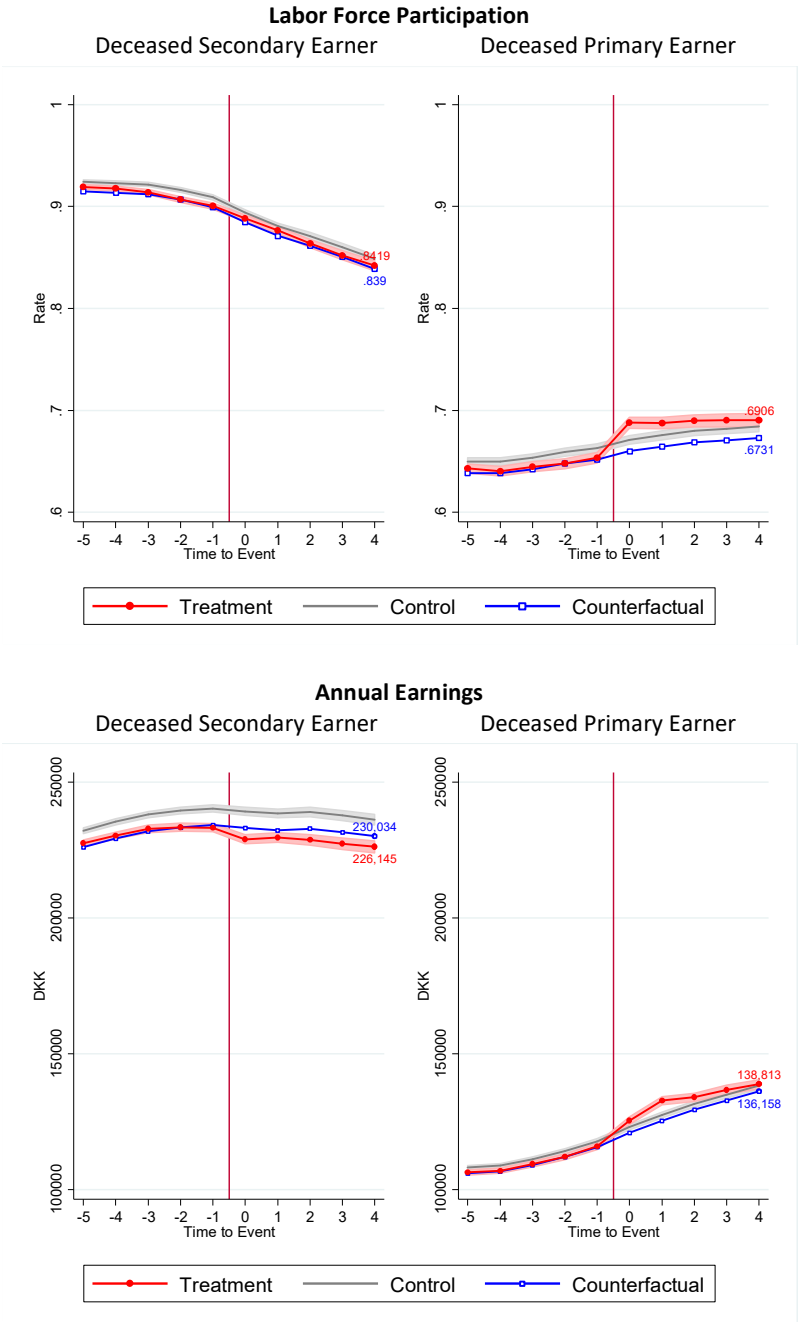
Appendix Figure B.1: Spousal Labor Supply Responses to Fatal Health Events—Different Values of the Bandwidth Δ



Notes: These figures plot spouses' labor supply responses to fatal health events using different potential control groups that differ by the choice of the bandwidth Δ. The sample includes households in which one spouse died between years 1985 and 2011 and was age 45 to 80 in the year of the (actual or placebo) event. The x-axis denotes time with respect to the event, normalized to period 0. For the treatment group, period 0 is when the actual event occurs; for the control groups period 0 is when a "placebo" event occurs (while their actual event occurs in period Δ). To ease the comparison of trends, from which the treatment effect is identified, we normalize the level of the control groups' outcome to the pre-event level of the treatment group's outcome (in period -2). These normalized counterfactuals are what is displayed in the figures. Similar to the description in Appendix Table B.3, we ensure comparability across bandwidths by requiring that the range of calendar years in which households experience the event—which determines the composition of the treatment/control groups for any choice of bandwidth—would be similar across choices of Δ; so that the last event year is 2004.

Appendix C: Fatal Health Events—Potential Mechanisms and Mitigating Factors

Appendix Figure C.1: Spouses' Labor Supply Responses to Fatal Health Events by Earner Status



Notes: These figures plot spouses' labor supply responses to fatal health events by the earnings status of the deceased spouse. Deceased spouses are defined to have been primary earners or secondary earners by whether the share of their average labor income in the pre-event period out of the household's average labor income in the pre-event period was higher or lower than half. The sample includes prime-age households prior to the Early Retirement Age (of 60) in which one spouse died between years 1985 and 2011. The figures are constructed as described in the notes of Figure 2.

Appendix Table C.1: Spousal Labor Supply Responses to Fatal Health Events by the Deceased Spouse's Primary Earner Status

Participation	All (1)	Widowers (2)	Widows (3)
Treat × Post	-.0096	-.0141	-.0041
	(.0026)	(.0034)	(.0041)
Treat × Post ×	.0306	.0119	.0284
Deceased Primary Earner	(.0043)	(.0102)	(.0055)
Number of observations	1,017,095	359,440	657,655
Number of clusters	182,980	63,736	119,247

Earnings	All (1)	Widowers (2)	Widows (3)
Treat × Post	-6,563	-10,998	-1,735
	(981)	(1,525)	(1,112)
Treat × Post ×	10,599	9,143	6,854
Deceased Primary Earner	(1,256)	(3,142)	(1,357)
Number of observations	1,017,095	359,440	657,655
Number of clusters	182,980	63,736	119,247

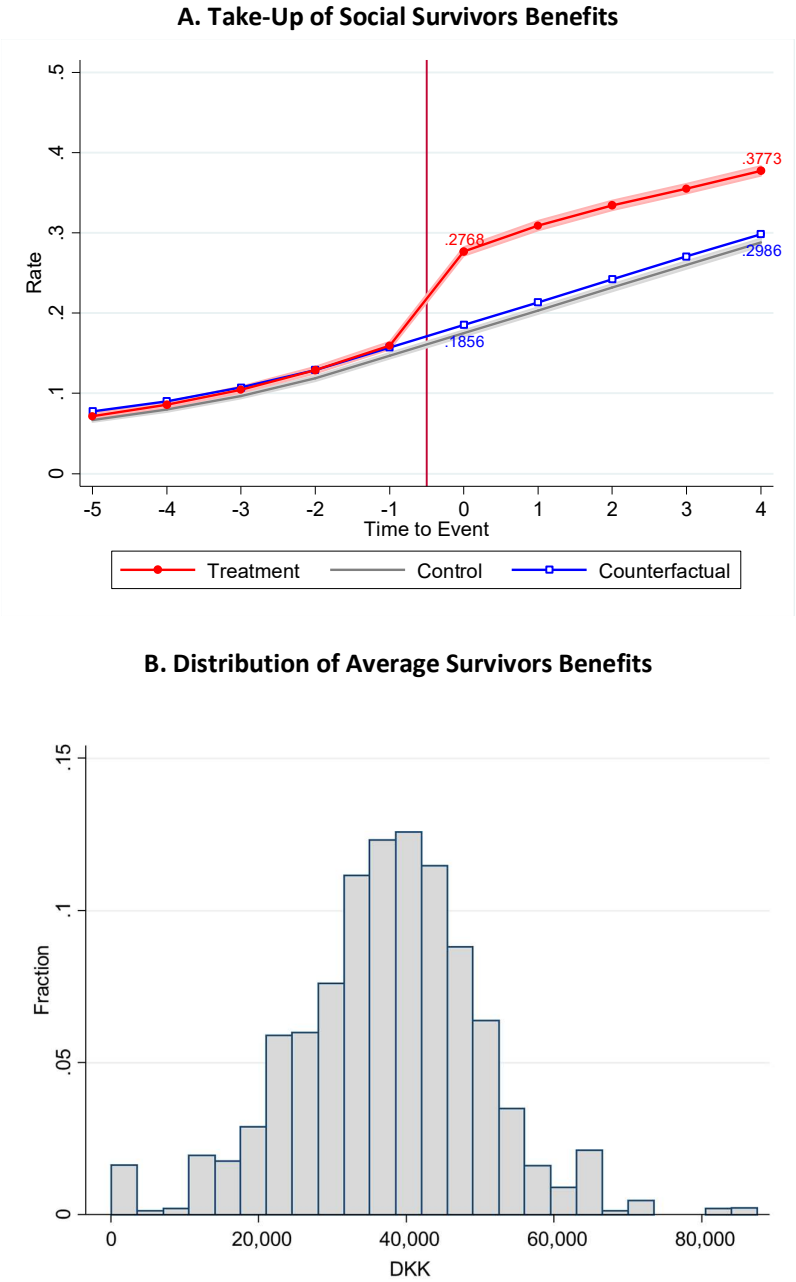
Notes: This table reports the interaction of the treatment effect of fatal spousal health events with the earnings status of the deceased spouse. Deceased spouses are defined to have been primary earners or secondary earners by whether the share of their average labor income in the pre-event period out of the household's average labor income in the pre-event period was higher or lower than half. The sample includes prime-age households prior to the Early Retirement Age (of 60) in which one spouse died between years 1985 and 2011. All specifications include year, spouse's age, and household fixed effects. The post-event periods include periods 2 to 4. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Table C.2: Spousal Labor Force Participation Responses to Fatal Health Events by the Degree of Income Loss

1. Baseline Regression	All Households (1)	Widowers (2)	Widows (3)
Treat × Post	.1265	.1220	.1170
	(.0023)	(.0042)	(.0027)
Treat × Post × Replacement Rate	-.1889	-.1894	-.1744
	(.0035)	(.0061)	(.0044)
Number of observations	4,288,621	1,387,615	2,901,006
Number of clusters	500,157	165,939	334,220
2. Regression with Interactions	All Households (1)	Widowers (2)	Widows (3)
Treat × Post × Replacement Rate	-.1995	-.2017	-.1941
	(.0047)	(.0085)	(.0058)
Number of observations	2,828,569	848,715	1,979,854
Number of clusters	321,992	98,694	223,299
Regression 1 for Sub-Sample of Regression 2			
Treat × Post × Replacement Rate	-.1927	-.1917	-.1841
	(0.0045)	(0.0081)	(0.0056)

Notes: This table reports the interaction of the treatment effect of fatal spousal health events with the household's post-event income replacement rate. This replacement rate is calculated as follows. First, we fix the surviving spouse's labor income, Social Disability, and Social Security benefits at their pre-event levels (in period -1). Then, we calculate the ratio of this adjusted household income in period 1 (post-event) to that in period -1 (pre-event), and we normalize it by the average ratio for the control group in order to purge life-cycle and time effects. We report estimates of two specifications. Specification 1 estimates a differences-in-differences specification which interacts the treatment effect with the replacement rate variable. Specification 2 extends specification 1 to include interactions of the treatment effect with additional household characteristics: age fixed effects for the surviving spouse, fixed effects for the age of the deceased at the year of death, year fixed effects, indicators for the number of children in the household and for the presence of adult children (18 or older) and young children (6 or younger), as well as the surviving spouse's months of education (and its square). The results are also robust to the inclusion of a quadratic in the household's net wealth. Since there are households with missing values for some of the controls (that are therefore included in the estimation of specification 1 but not 2), we show the robustness of our estimate of interest (*Treat* × *Post* × *Replacement Rate*) to the inclusion of this set of controls by reporting estimates for specification 1 for the sub-sample of households that are included in the estimation of specification 2. All specifications include year, spouse's age, and household fixed effects. The post-event periods include periods 2 to 4. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Figure C.2: Social Survivors Benefits for Widows



Notes: These figures include widows younger than the Full Retirement Age (of 67) in years prior to 1994 (when there is a data break in the reporting method of benefits received through Social Disability Insurance). Panel A plots these widows' take-up of social survivors benefits through the Social Disability Insurance (Social DI) program around the death of their spouse. This figure is constructed as described in the notes of Figure 2. Panel B displays the distribution of the instrument that we use in the estimation of Appendix Table C.3, i.e., the year-by-municipality ("leave-one-out") mean of survivors benefits received by non-working surviving spouses through Social DI.

Appendix Table C.3: Widows' Labor Force Participation Responses to Fatal Spousal Health Events by the Generosity of Social Survivors Benefits

	Reduced Form	First Stage	Two-Stage Least Squares
	(1)	(2)	(3)
Treat × Post × Municipality-Specific Survivors Benefits Receipts	-.000913 (.000332)		
Treat × Post × Survivors Benefits		.1468 (.0298)	-.0057 (.0020)
Mean Treatment Effect			1.8
Counterfactual Mean Participation Rate			48.7
Combined Mean Participation Rate			50.5
Number of observations	364,100	364,100	364,100
Number of clusters	268	268	268

Notes: This table reports the interaction of the treatment effect of fatal spousal health events with the generosity of survivors benefits that widows receive through the Social Disability Insurance (Social DI) program. The instrument we use for actual benefits received by widows is constructed as follows. In each year we calculate for each municipality the average benefits received by non-working surviving spouses through Social DI. Then, we assign to each widow in the treatment group her respective municipality-year leave-one-out mean. Benefits are measured in annual DKK 1,000 ($125) units. The sample includes widows under age 67 (the age at which the program transitions into the Old-Age Pension for the studied population) in years prior to 1994 (when there is a data break in the reporting method of survivors benefits received through Social DI). The controls included in the estimation are municipality unemployment rate and average earnings (and their interaction with *Treat*, *Post*, and *Treat* × *Post*) as well as widow's age, year, and municipality fixed effects. The post-event periods include periods 2 to 4. Robust standard errors clustered at the municipality level are reported in parentheses. The F-statistic on the excluded instrument in the first stage is 24.25. With an average of DKK 23,262 ($2,908) in actual survivors benefits received by widows in the analysis sample (including zeros for those not on the program) and with a baseline mean participation rate of .505, the regression estimate translates to a participation elasticity with respect to social benefits of -.26.

Appendix Table C.4: Labor Force Participation Responses of Widows Who Did Not Work before the Event

	Mean Spousal Labor Force Participation	Spousal Participation by the Deceased's Employment History	Overall Household Income by the Deceased's Employment History
	(1)	(2)	(3)
Treat × Post	.0132	.0078	-72,326
	(.0005)	(.0005)	(851)
Treat × Post ×		.0461	-59,208
Deceased Worked		(.0027)	(7,148)
Number of observations	1,320,908	1,320,908	1,320,908
Number of clusters	176,167	176,167	176,167

Notes: This table reports estimates of the labor force participation responses of widows who did not work during the five-year period preceding their spouse's death. The sample includes households in which a husband died and in which he either worked throughout the entire five-year period preceding his death (periods -5 to -1) or did not work altogether during this period. Column 1 reports the differences-in-differences estimate based on equation (2), in which the outcome variable is spousal labor force participation. Column 2 adds an interaction of the treatment effect with an indicator for whether the husband worked before his death. Column 3 runs the same specification as in column 2 but where the outcome variable is the household's overall income. All specifications include year, spouse's age, and household fixed effects, and additionally include the interaction with *Post* of covariates that are interacted with *Treat* × *Post*. The post-event periods include periods 2 to 4. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Table C.5: Spouses' Labor Supply Responses to Fatal Health Events by the Degree of Income Loss—Ability to Respond

A. Prime Age Surviving Spouses		
	Participation by Spouses who Did Not Work (1)	Full-Time by Spouses who Worked Part-Time (2)
1. Baseline Regression		
Treat × Post	.1703	.1471
	(.0116)	(.0118)
Treat × Post × Replacement Rate	-.1800	-.2022
	(.0192)	(.0183)
2. Regression with Interactions		
Treat × Post × Replacement Rate	-.1673	-.1856
	(.0198)	(.0192)
Number of observations	104,431	287,672
Number of clusters	15,354	41,852

B. Earnings Responses by Surviving Spouses of All Ages			
	Earnings		
	All Households (1)	Spouses who Continuously Did Not Work (2)	Spouses who Continuously Worked (3)
1. Baseline Regression			
Treat × Post	58,988	5,516	90,309
	(741)	(445)	(1,572)
Treat × Post × Replacement Rate	-93,207	-7,511	-126,393
	(1,269)	(720)	(2,313)
2. Regression with Interactions			
Treat × Post × Replacement Rate	-84,268	-7,699	-123,378
	(1,272)	(756)	(2,412)
Number of observations	2,741,690	1,145,815	1,049,039
Number of clusters	311,152	145,183	132,743

Notes: This table reports the interaction of the treatment effect of fatal spousal health events with the household's post-event income replacement rate. This replacement rate is calculated as described in the notes of Appendix Table C.2. Panel A reports estimates for the sample of surviving spouses younger than the Early Retirement Age (of 60): in column 1 we study participation responses by surviving spouses who did not work for the entire pre-period; and in column 2 we study full-time employment by surviving spouses who worked for the entire pre-period where at least one of these periods involved part-time work. Panel B reports estimates for the sample of all surviving spouses: in column 1 we study earnings responses by all surviving spouses; in column 2 we study earnings responses by surviving spouses who did not work for the entire pre-period; and in column 3 we study earnings responses by surviving spouses who worked for the entire pre-period. In each panel, we report estimates of two specifications. Specification 1 estimates a differences-in-differences specification which interacts the treatment effect with the replacement rate variable. Specification 2 extends specification 1 to include interactions of the treatment effect with additional household characteristics: age fixed effects for the surviving spouse, fixed effects for the age of the deceased at the year of death, year fixed effects, indicators for the number of children in the household and for the presence of adult children (18 or older) and young children (6 or younger), the surviving spouse's gender, and the surviving spouse's months of education (and its square). In both specifications 1 and 2 we include only households for whom there are no missing values for this entire set of controls. All specifications include year, spouse's age, and household fixed effects. The post-event periods include periods 2 to 4. Robust standard errors clustered at the household level are reported in parentheses.

Appendix Table C.6: Spouses' Labor Supply Responses to Fatal Health Events—Presence of Children

	Participation		Earnings	
Treat × Post ×				
Child age 0-12	-.0217	-.0227	-8,097	-8,272
	(.0099)	(.0099)	(2,320)	(2,322)
Child age 13-19	-.0033	-.0039	1,418	1,322
	(.0062)	(.0062)	(1,351)	(1,353)
Child age 20-29	-.0007	-.0010	683	638
	(.0045)	(.0045)	(883)	(883)
Child age 30 and older	.0045	.0046	800	809
	(.0057)	(.0057)	(1,123)	(1,123)
Have child		.0225		3,790
		(.01366)		(2,940)
Number of observations	1,884,335	1,884,335	1,884,335	1,884,335
Number of clusters	211,872	211,872	211,872	211,872

Notes: This table reports the interaction of the treatment effect of fatal spousal health events with indicators for the presence of children and for having children in different age ranges. The sample includes female surviving spouses from households in which the husband died between years 1985 and 2011 and for whom the value of the number of children is non-missing. All specifications include year, spouse's age, and household fixed effects, education and its square, and interactions with age indicators so that interactions with children variables are not confounded by the surviving spouse's age. The post-event periods include periods 2 to 4. Robust standard errors clustered at the household level are reported in parentheses.

Appendix D: Non-Fatal Health Events—Heterogeneity

Appendix Table D.1: Household Responses to Non-Fatal Health Shocks of Differential Severity

	Sick Individual				Household Income		Spouse			
	Participation		Earnings				Participation		Earnings	
	Short Run	Medium Run	Short Run	Medium Run	Short Run	Medium Run	Short Run	Medium Run	Short Run	Medium Run
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High Severity × Post	-.0446	-.0575	-13,960	-15,638	-4,987	-5,495	.0001	.0018	-354	101
	(.0051)	(.0062)	(1,576)	(1,860)	(3,823)	(4,998)	(.0043)	(.0049)	(1,122)	(1,278)
Number of observations	207,617		207,617		207,617		207,617		207,617	
Number of households	34,642		34,642		34,642		34,642		34,642	

Notes: This table reports estimates of changes in household labor supply and overall income in response to non-fatal health shocks with different degrees of severity. The sample includes only households in the treatment group within our sample of non-fatal health shocks, which we divide by the shock's severity according to the 75th percentile of the distribution of hospitalization days associated with the shock (10 days in our sample). We construct a binary variable of "high severity" by assigning the value 0 for households in which the sick individual was hospitalized for less than 10 days following the shock, and the value 1 for households in which the sick individual was hospitalized for 10 days or more following the shock. We then estimate a specification similar to that from Table 2 but where we substitute the variable *Treat* with the variable *High Severity*. Household income (in columns 5 and 6) includes income from any source—including earnings, capital income, annuity payouts, and benefits from any social program. The regressions include household fixed effects and robust standard errors clustered at the household level are reported in parentheses.

Appendix Table D.2: Hospitalization Days and Shock Severity

Appendix Table D.2.a: Heterogeneous Effects on Severity Proxies in Danish Administrative Data

Dependent variable:	Sick Individual			
	DI Take-Up		Primary Health Care	
	Short Run (1)	Medium Run (2)	Short Run (3)	Medium Run (4)
High Severity × Post	.0800	.0926	.1062	.1241
	(.0049)	(.0058)	(.0056)	(.0063)
Number of observations	207,617		207,617	
Number of households	34,642		34,642	

Notes: This table reports estimates of changes in outcomes that proxy for the degree of morbidity in response to non-fatal health shocks with different lengths of hospitalization stays associated with the shock. The estimations follow the note of Appendix Table D.1.

Appendix Table D.2.b: Associations between Hospitalization Days and Activities of Daily Living in HRS

Panel 1: Correlations

	Any ADL Problem
Total Hospital Nights	.203
95% Confidence Interval	(.179,.228)
Number of observations	5,948
Number of households	5,599

Panel 2: Regressions

	Any ADL Problem (1)	Any ADL Problem (2)	Any ADL Problem (3)	Any ADL Problem (4)
Hospital Nights	.0111	.0111	.0102	.0098
	(.0007)	(.0007)	(.0007)	(.0007)
Wave FE		X	X	X
Age FE			X	X
Additional Controls				X
Mean ADL Problem	0.366	0.366	0.366	0.366
Mean Hospital Nights	8.973	8.973	8.973	8.973
Number of observations	5,948	5,948	5,948	5,948
Number of households	5,599	5,599	5,599	5,599

Notes: This table reports associations between hospitalization nights and the ability to perform daily activities using data from the Health and Retirement Study (HRS). We analyze observations of individuals who were recently hospitalized and who recently had a heart attack or a stroke. To do so, we pull individual data from the RAND HRS Longitudinal File 2016 (V1) and we keep the more recent waves (4 through 13). We keep individuals who have been hospitalized overnight since the last interview (or in the last two years) and have experienced a new heart attack or a new stroke since the last interview. We drop observations with extremely long hospitalization spells (45+ nights in the hospital, which corresponds to the 95th percentile). We define our outcome variable to be an indicator for having "any ADL problem." Activities of daily living (ADLs) include bathing, dressing, eating, getting in and out of bed, walking across the room. Our main right-hand side variable is total nights at a hospital. Panel 1 computes the correlations between the two variables, and panel 2 runs regressions with various sets of controls, where standard errors are clustered at the individual level. "Additional Controls" include indicators for gender, being married, and being college educated.

Appendix Table D.3: Spouses' Labor Supply Responses to Severe Non-Fatal Health Shocks by the Degree of Income Loss

1. Baseline Regression	Participation
Treat × Post	.1436
	(.0131)
Treat × Post × Replacement Rate	-.1493
	(.0130)
2. Regression with Interactions	Participation
Treat × Post × Replacement Rate	-.1512
	(.0129)
Number of observations	438,356
Number of clusters	61,595

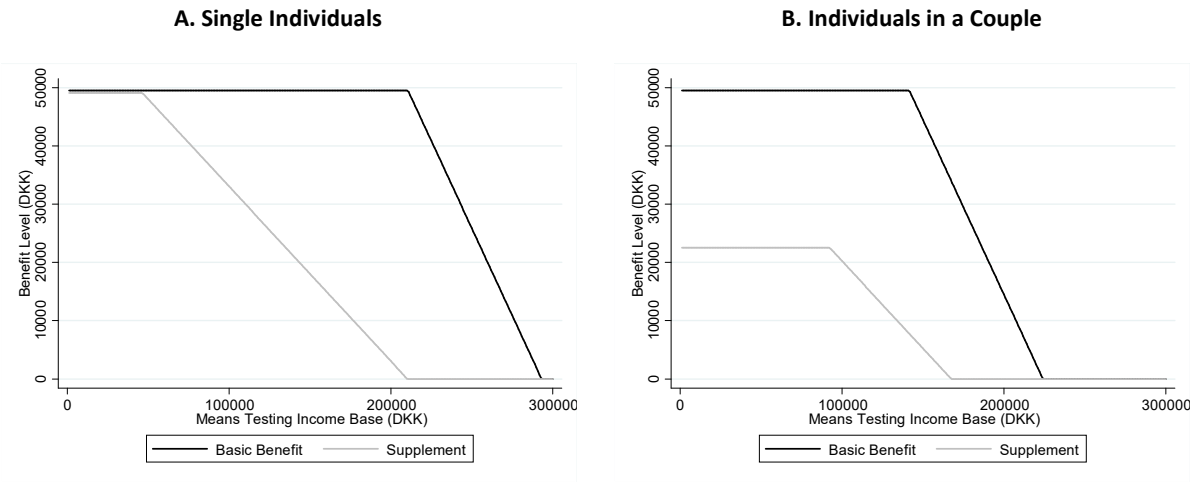
Notes: This table reports the interaction of the treatment effect of non-fatal spousal health shocks with the household's post-shock income replacement rate. This replacement rate is calculated as described in the notes of Appendix Table C.2. Specification 1 estimates a differences-in-differences specification which interacts the treatment effect with the replacement rate variable. Specification 2 extends specification 1 to include interactions of the treatment effect with additional household characteristics: age fixed effects for both spouses, year fixed effects, indicators for the number of children in the household, the spouse's gender, the spouse's months of education (and its square), and a quadratic in the household's net wealth. Both specifications include age fixed effects for both spouses, year fixed effects, and household fixed effects. The post-shock periods include periods 1 to 3. Robust standard errors clustered at the household level are reported in parentheses.

Appendix E: Institutional Details

Appendix Table E.1: Summary of Income Insurance Schemes for Sick Individuals and Surviving Spouses in Denmark

Program/Plan	Details and Eligibility Criteria	Benefit Levels
Social Disability Insurance	The basic eligibility criterion is a prolonged need for support that is presumed to last until the transition into the Old-Age Pension. Since 1984 the Danish Social DI has a broad social insurance scope: it can be awarded to individuals who prove that they are unable to engage in substantial gainful activity either for medical or for non-medical (vaguely defined) social reasons. In our setting, the program effectively applies to permanently sick individuals and to surviving spouses who are determined unable to maintain their standard of living on their own (primarily widows who had a weak attachment to the labor force prior to their husband's death). Within the context of social reasons, individuals will be automatically considered ineligible if their annual earnings in the years just before their application exceeded a certain threshold (which in 2000 was DKK 148,000 for married applicants and DKK 98,700 for singles).	Approved applications provide benefits permanently, which in 2000, for example, amounted to DKK 72,100 ($9,000) per year for married or cohabiting individuals and DKK 98,700 ($12,300) for single individuals. These benefits are income-tested as described in Appendix Figure E.1. They are flat rated with respect to the earnings histories.
Privately-purchased insurance policies (in group or non-group markets)	Some labor market pension schemes include employer-based insurance policies. These types of pension plans were generally common throughout our sample period in the public sector, which composes 30% of the Danish labor market and is covered by collective agreements. In addition, based on a reform that was announced in 1987 and was implemented in 1993, most of the segment of the private sector that is covered by collective agreements (75% of the labor force in the private sector) has introduced mandatory defined-contribution pension plans, some of which may include components of life insurance or insurance against specific health events. These latter schemes pay out a lump sum to sick workers who experience a severe health event, or to a surviving spouse in case the plan member dies. Subject to health screenings, individuals may also purchase insurance policies in the private non-group market.	The rates of these payouts are set by the individual pension funds. For example, some large white-collar group-market policies guarantee DKK 1,076,000 ($162,050) if the insured employees die before age 45, DKK 853,000 ($128,460) if they die between ages 45 and 54, and DKK 538,000 ($81,025) if they die between ages 55 and 66, with no transfers if the insured die at or after they reach age 67.
Voluntary Early Retirement Pension (VERP)	At the Early Eligibility Age (EEA) of 60 and until they reach their Old-Age Pension retirement age, individuals who have voluntarily been members of an unemployment fund for a sufficiently long period (of 10 years before 1992 which has gradually increased to 20 years thereafter) are eligible for the Voluntary Early Retirement Pension (VERP). Approximately 80% of the population is eligible for VERP.	Flat-rate annual income that amounted to roughly DKK 135,000 ($16,875) in 2000.
Old-Age Pension (OAP)	At the Full Retirement Age (FRA) of 67 (or 65 for those born after July 1st, 1939) all residents become eligible for the Old-Age Pension (OAP).	The program provides annuities that in 2000 amounted to DKK 72,100 ($9,000) for married individuals and DKK 98,700 ($12,300) for single individuals (similar to the benefit levels paid to Social DI beneficiaries). Note that DI and OAP are different components of the same social insurance program of Social Pensions, similar to Social Security in the US, and that Social DI recipients automatically transition into the Old-Age Pension program at their FRA. Benefits are income-tested as described in Appendix Figure E.1.
ATP	A small government-mandated pension scheme that applies to all wage earners in Denmark.	The program pays out a life annuity to individuals who reached their FRA, based on the number of years they contributed to the scheme. In 2003, for example, the average annual payout from the scheme amounted to DKK 4,900 ($612). There is a small life insurance element tied to this scheme. Until 2002 a surviving spouse was eligible for 30% of the capitalized value of the deceased spouse's remaining ATP benefits. Since 2002 survivors are instead eligible for a lump sum of DKK 40,000 ($5,000), taxed at 40%, if the deceased spouse is younger than 67 at death (which progressively reduces with the deceased's age at death and entirely lapses if the spouse dies after age 70).

Appendix Figure E.1: Means-Testing of Social Pensions
(Social Disability Insurance and Old-Age Pension)



Notes: These figures plot the means-testing rules (at year 2000 rates and thresholds) in benefit levels transferred to households through the Social Pension (SP) scheme, which includes the Social Disability Insurance (DI) and the Old-Age Pension (OAP) programs. Panel A plots the rules for single recipients, and panel B plots the rules for married or cohabiting recipients. In both DI and OAP, the income-tested transfers consist of a *basic benefit* of DKK 49,560 (solid black lines) and a *supplement* of DKK 49,140 for single individuals and DKK 22,536 for individuals in a couple (solid gray lines). The y-axis denotes (pre-income-tax) benefit levels; the x-axis denotes the corresponding means-testing (pre-tax) income bases. For the basic benefit, the income base for DI recipients is own overall non-SP income, and the income base for OAP recipients is own labor earnings. For the supplement, within both DI and OAP, the income base in panel A is own overall non-SP income, and the income base in panel B is the household's overall income (excluding own SP benefits).