Online Appendix for

"Recessions, Older Workers, and Longevity: How Long Are Recessions Good For Your Health?"

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Appendix Table 1: Survival Probabilities

Exact	Survival Through Age:												
Age	55	56	57	58	59	60	61	62	63	64	65	66	67
55	0.990	0.979	0.968	0.955	0.943	0.929	0.915	0.900	0.884	0.868	0.851	0.833	0.814
56		0.989	0.978	0.965	0.952	0.939	0.924	0.909	0.893	0.877	0.860	0.842	0.823
57			0.988	0.976	0.963	0.949	0.935	0.919	0.903	0.887	0.869	0.851	0.832
58				0.987	0.974	0.960	0.946	0.930	0.914	0.897	0.879	0.861	0.842
59					0.987	0.973	0.958	0.942	0.925	0.909	0.890	0.872	0.852
60						0.986	0.971	0.954	0.938	0.921	0.902	0.883	0.864
61							0.985	0.968	0.951	0.934	0.916	0.896	0.876
62								0.983	0.966	0.949	0.930	0.910	0.890
63									0.983	0.965	0.945	0.926	0.905
64										0.982	0.962	0.942	0.921
65											0.980	0.959	0.938
66												0.979	0.957
67													0.978
68													
69													
70													
71													
72													
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Notes: Survival probabilities reflect authors' calculations from the U.S. Vital Statistics data on the universe of death certificates. Figures represent an average for the 1910-1929 birth cohorts.

Appendix Table 1 (continued): Survival Probabilities

	Survival Through Age:											
Exact Age	68	69	70	71	72	73	74	75	76	77	78	79
55	0.795	0.774	0.753	0.730	0.707	0.683	0.658	0.632	0.605	0.578	0.549	0.520
56	0.803	0.782	0.761	0.738	0.714	0.690	0.664	0.638	0.611	0.583	0.555	0.525
57	0.812	0.791	0.769	0.746	0.722	0.697	0.672	0.645	0.618	0.590	0.561	0.531
58	0.821	0.800	0.778	0.755	0.731	0.705	0.679	0.653	0.625	0.597	0.567	0.537
59	0.832	0.810	0.788	0.764	0.740	0.714	0.688	0.661	0.633	0.604	0.575	0.544
60	0.843	0.821	0.799	0.775	0.750	0.724	0.697	0.670	0.641	0.612	0.582	0.551
61	0.855	0.833	0.810	0.786	0.761	0.734	0.707	0.679	0.651	0.621	0.591	0.559
62	0.868	0.846	0.823	0.798	0.772	0.746	0.718	0.690	0.661	0.630	0.600	0.568
63	0.883	0.860	0.836	0.811	0.785	0.758	0.730	0.701	0.672	0.641	0.610	0.577
64	0.898	0.875	0.851	0.826	0.799	0.771	0.743	0.714	0.684	0.652	0.620	0.587
65	0.915	0.892	0.867	0.841	0.814	0.786	0.757	0.727	0.696	0.664	0.632	0.598
66	0.934	0.910	0.885	0.858	0.830	0.801	0.772	0.741	0.710	0.678	0.644	0.610
67	0.954	0.929	0.903	0.876	0.848	0.819	0.788	0.757	0.725	0.692	0.658	0.623
68	0.976	0.951	0.924	0.896	0.867	0.837	0.806	0.775	0.742	0.708	0.673	0.637
69		0.974	0.947	0.919	0.889	0.858	0.826	0.794	0.760	0.725	0.690	0.653
70			0.972	0.943	0.912	0.881	0.848	0.815	0.780	0.744	0.708	0.670
71				0.970	0.938	0.906	0.872	0.838	0.802	0.765	0.728	0.689
72					0.967	0.934	0.899	0.864	0.827	0.789	0.750	0.710
73						0.965	0.929	0.893	0.855	0.815	0.775	0.734
74							0.963	0.925	0.885	0.845	0.803	0.760
75								0.960	0.919	0.877	0.834	0.789
76									0.957	0.913	0.868	0.822
77										0.954	0.907	0.858
78											0.950	0.900
79												0.946

Notes: Survival probabilities reflect authors' calculations from the U.S. Vital Statistics data on the universe of death certificates. Figures represent an average for the 1910-1929 birth cohorts.

Appendix Table 2: Impact of Unemployment Rates at Specific Ages on Survival Rates at Different Ages

Unemp.	Survival to Age:											
at Age:	55	56	57	58	59	60	61	62	63	64	65	66
55	0.0019	0.0065	0.0144	0.0175	0.0189	0.0208	0.0162	0.0138	0.0065	0.0009	-0.0015	-0.0011
	(0.0019)	(0.0034)	(0.0049)	(0.0055)	(0.0055)	(0.0066)	(0.0074)	(0.0079)	(0.0087)	(0.0094)	(0.0098)	(0.0106)
56		0.0039	0.0121	0.0138	0.0149	0.0162	0.0100	0.0091	-0.0012	-0.0079	-0.0116	-0.0127
		(0.0026)	(0.0042)	(0.0057)	(0.0062)	(0.0075)	(0.0077)	(0.0076)	(0.0087)	(0.0093)	(0.0097)	(0.0105)
57			0.0078	0.0089	0.0096	0.0095	0.0042	0.0020	-0.0079	-0.0168	-0.0200	-0.0199
			(0.0028)	(0.0050)	(0.0062)	(0.0083)	(0.0082)	(0.0077)	(0.0083)	(0.0081)	(0.0086)	(0.0095)
58				0.0034	0.0062	0.0050	-0.0028	-0.0114	-0.0202	-0.0290	-0.0303	-0.0311
				(0.0027)	(0.0042)	(0.0061)	(0.0071)	(0.0079)	(0.0092)	(0.0098)	(0.0094)	(0.0093)
59					0.0088	0.0083	0.0027	-0.0071	-0.0167	-0.0270	-0.0272	-0.0311
					(0.0025)	(0.0039)	(0.0057)	(0.0072)	(0.0088)	(0.0103)	(0.0097)	(0.0095)
60						0.0013	0.0003	-0.0059	-0.0099	-0.0184	-0.0186	-0.0235
						(0.0020)	(0.0039)	(0.0054)	(0.0073)	(0.0094)	(0.0101)	(0.0107)
61							0.0023	0.0003	0.0002	-0.0077	-0.0114	-0.0143
							(0.0022)	(0.0037)	(0.0059)	(0.0080)	(0.0090)	(0.0103)
62								0.0016	0.0054	0.0016	0.0022	0.0036
								(0.0025)	(0.0040)	(0.0058)	(0.0059)	(0.0073)
63									0.0089	0.0100	0.0141	0.0193
									(0.0025)	(0.0047)	(0.0050)	(0.0068)
64										0.0039	0.0093	0.0160
										(0.0032)	(0.0046)	(0.0057)
65											0.0062	0.0120
											(0.0028)	(0.0051)

Notes: coefficients and standard errors multiplied by 100; standard errors are shown in parentheses. Every cell in the table represents the coefficient on the unemployment rate in a linear probability model that also includes year fixed effects, state fixed effects, and state-specific linear trends. See paper for more details on these calculations.

Appendix Table 2 (continued): Impact of Unemployment Rates at Specific Ages on Survival Rates at Different Ages

Unemp.	Survival to Age:												
at Age:	67	68	69	70	71	72	73	74	75	76	77	78	79
55	-0.0073	-0.0115	-0.0126	-0.0161	-0.0160	-0.0119	-0.0081	-0.0067	-0.0040	-0.0004	0.0010	0.0036	0.0070
	(0.0115)	(0.0127)	(0.0131)	(0.0139)	(0.0148)	(0.0154)	(0.0167)	(0.0193)	(0.0190)	(0.0204)	(0.0212)	(0.0221)	(0.0216)
56	-0.0183	-0.0248	-0.0254	-0.0329	-0.0338	-0.0302	-0.0254	-0.0225	-0.0217	-0.0203	-0.0212	-0.0149	-0.0119
	(0.0118)	(0.0125)	(0.0134)	(0.0143)	(0.0146)	(0.0149)	(0.0159)	(0.0172)	(0.0173)	(0.0189)	(0.0200)	(0.0204)	(0.0203)
57	-0.0234	-0.0275	-0.0282	-0.0371	-0.0386	-0.0368	-0.0326	-0.0335	-0.0323	-0.0301	-0.0325	-0.0268	-0.0226
	(0.0103)	(0.0109)	(0.0119)	(0.0130)	(0.0129)	(0.0132)	(0.0135)	(0.0146)	(0.0154)	(0.0167)	(0.0183)	(0.0192)	(0.0204)
58	-0.0361	-0.0388	-0.0406	-0.0529	-0.0573	-0.0571	-0.0560	-0.0559	-0.0563	-0.0575	-0.0594	-0.0554	-0.0514
	(0.0095)	(0.0110)	(0.0121)	(0.0127)	(0.0132)	(0.0136)	(0.0144)	(0.0156)	(0.0165)	(0.0179)	(0.0201)	(0.0209)	(0.0218)
59	-0.0344	-0.0332	-0.0330	-0.0447	-0.0503	-0.0511	-0.0520	-0.0510	-0.0503	-0.0497	-0.0467	-0.0451	0.0418
	(0.0092)	(0.0104)	(0.0115)	(0.0128)	(0.0141)	(0.0143)	(0.0147)	(0.0151)	(0.0157)	(0.0173)	(0.0193)	(0.0200)	(0.0214)
60	-0.0255	-0.0235	-0.0216	-0.0273	-0.0348	-0.0352	-0.0378	-0.0365	-0.0355	-0.0389	-0.0353	-0.0339	0.0293
	(0.0104)	(0.0107)	(0.0111)	(0.0122)	(0.0140)	(0.0140)	(0.0142)	(0.0144)	(0.0157)	(0.0177)	(0.0190)	(0.0200)	(0.0215)
61	-0.0189	-0.0142	-0.0157	-0.0170	-0.0211	-0.0232	-0.0282	-0.0288	-0.0277	-0.0276	-0.0244	-0.0258	0.0247
	(0.0107)	(0.0110)	(0.0118)	(0.0118)	(0.0131)	(0.0131)	(0.0134)	(0.0129)	(0.0147)	(0.0165)	(0.0166)	(0.0175)	(0.0192)
62	0.0025	0.0064	0.0049	0.0029	0.0041	0.0036	0.0004	-0.0030	-0.0019	-0.0015	0.0001	-0.0070	-0.0140
	(0.0081)	(0.0091)	(0.0098)	(0.0108)	(0.0113)	(0.0108)	(0.0121)	(0.0124)	(0.0127)	(0.0141)	(0.0139)	(0.0150)	(0.0157)
63	0.0208	0.0241	0.0221	0.0220	0.0254	0.0237	0.0231	0.0171	0.0143	0.0134	0.0127	0.0056	-0.0035
	(0.0086)	(0.0095)	(0.0098)	(0.0103)	(0.0108)	(0.0107)	(0.0119)	(0.0121)	(0.0125)	(0.0132)	(0.0133)	(0.0141)	(0.0139)
64	0.0207	0.0239	0.0216	0.0234	0.0297	0.0254	0.0263	0.0182	0.0143	0.0114	0.0086	0.0009	-0.0101
	(0.0076)	(0.0086)	(0.0096)	(0.0103)	(0.0118)	(0.0124)	(0.0139)	(0.0145)	(0.0150)	(0.0157)	(0.0155)	(0.0165)	(0.0166)
65	0.0175	0.0204	0.0157	0.0185	0.0234	0.0193	0.0186	0.0116	0.0092	0.0050	-0.0009	-0.0077	-0.0183
	(0.0071)	(0.0082)	(0.0096)	(0.0109)	(0.0132)	(0.0147)	(0.0159)	(0.0169)	(0.0181)	(0.0193)	(0.0195)	(0.0201)	(0.0207)

Notes: coefficients and standard errors multiplied by 100; standard errors are shown in parentheses. Every cell in the table represents the coefficient on the unemployment rate in a linear probability model that also includes year fixed effects, state fixed effects, and state-specific linear trends. See paper for more details on these calculations.

Appendix Table 3: Impact of Unemployment Rates at Specific Ages on Mortality Rates at Different Ages

Unemp.	Survival to Age:											
at Age:	55	56	57	58	59	60	61	62	63	64	65	66
55	-0.0019	-0.0047	-0.0082	-0.0033	-0.0015	-0.0025	0.0046	0.0024	0.0078	0.0065	0.0024	0.0000
	(0.0019)	(0.0023)	(0.0024)	(0.0021)	(0.0022)	(0.0021)	(0.0028)	(0.0032)	(0.0028)	(0.0032)	(0.0038)	(0.0034)
56		-0.0039	-0.0085	-0.0018	-0.0012	-0.0017	0.0064	0.0008	0.0112	0.0077	0.0038	0.0022
		(0.0026)	(0.0027)	(0.0021)	(0.0022)	(0.0023)	(0.0025)	(0.0036)	(0.0027)	(0.0035)	(0.0038)	(0.0034)
57			-0.0078	-0.0011	-0.0008	0.0001	0.0055	0.0022	0.0108	0.0101	0.0036	0.0008
			(0.0028)	(0.0028)	(0.0024)	(0.0030)	(0.0022)	(0.0032)	(0.0023)	(0.0031)	(0.0038)	(0.0037)
58				-0.0034	-0.0029	0.0013	0.0083	0.0093	0.0099	0.0100	0.0022	0.0020
				(0.0027)	(0.0027)	(0.0029)	(0.0021)	(0.0032)	(0.0029)	(0.0036)	(0.0034)	(0.0036)
59					-0.0088	0.0004	0.0060	0.0102	0.0107	0.0113	0.0011	0.0052
					(0.0025)	(0.0024)	(0.0028)	(0.0035)	(0.0033)	(0.0039)	(0.0036)	(0.0034)
60						-0.0013	0.0010	0.0064	0.0045	0.0091	0.0012	0.0060
						(0.0020)	(0.0031)	(0.0033)	(0.0037)	(0.0037)	(0.0039)	(0.0030)
61							-0.0023	0.0020	0.0002	0.0081	0.0049	0.0035
							(0.0022)	(0.0026)	(0.0037)	(0.0035)	(0.0039)	(0.0030)
62								-0.0016	-0.0039	0.0038	-0.0004	-0.0015
								(0.0025)	(0.0031)	(0.0033)	(0.0030)	(0.0032)
63									-0.0089	-0.0014	-0.0043	-0.0058
									(0.0025)	(0.0035)	(0.0027)	(0.0040)
64										-0.0039	-0.0055	-0.0072
										(0.0032)	(0.0028)	(0.0035)
65											-0.0062	-0.0060
											(0.0028)	(0.0034)

Notes: coefficients and standard errors multiplied by 100; standard errors are shown in parentheses. Every cell in the table represents the coefficient on the unemployment rate in a linear probability model that also includes year fixed effects, state fixed effects, and state-specific linear trends. See paper for more details on these calculations.

Appendix Table 3 (continued): Impact of Unemployment Rates at Specific Ages on Mortality Rates at Different Ages

Unemp.	Survival to Age:												
at Age:	67	68	69	70	71	72	73	74	75	76	77	78	79
55	0.0073	0.0055	0.0013	0.0047	0.0003	-0.0041	-0.0051	-0.0011	-0.0056	-0.0055	-0.0042	-0.0074	-0.0120
	(0.0035)	(0.0039)	(0.0039)	(0.0030)	(0.0044)	(0.0040)	(0.0056)	(0.0061)	(0.0057)	(0.0060)	(0.0068)	(0.0075)	(0.0089)
56	0.0066	0.0085	0.0007	0.0104	0.0026	-0.0030	-0.0055	-0.0030	-0.0017	-0.0008	0.0012	-0.0112	-0.0093
	(0.0037)	(0.0039)	(0.0042)	(0.0035)	(0.0046)	(0.0041)	(0.0047)	(0.0052)	(0.0050)	(0.0065)	(0.0057)	(0.0060)	(0.0082)
57	0.0043	0.0056	0.0013	0.0120	0.0032	-0.0004	-0.0047	0.0025	-0.0012	-0.0012	0.0049	-0.0079	-0.0087
	(0.0037)	(0.0033)	(0.0039)	(0.0036)	(0.0049)	(0.0045)	(0.0047)	(0.0048)	(0.0044)	(0.0060)	(0.0060)	(0.0057)	(0.0081)
58	0.0064	0.0044	0.0026	0.0167	0.0079	0.0027	0.0014	0.0017	0.0029	0.0056	0.0068	-0.0012	-0.0042
	(0.0034)	(0.0032)	(0.0041)	(0.0038)	(0.0053)	(0.0044)	(0.0046)	(0.0044)	(0.0050)	(0.0064)	(0.0066)	(0.0071)	(0.0078)
59	0.0045	-0.0002	0.0001	0.0153	0.0094	0.0033	0.0040	0.0001	0.0011	0.0022	-0.0014	0.0026	-0.0026
	(0.0036)	(0.0030)	(0.0041)	(0.0047)	(0.0046)	(0.0050)	(0.0046)	(0.0048)	(0.0046)	(0.0061)	(0.0063)	(0.0060)	(0.0076)
60	0.0028	-0.0014	-0.0020	0.0074	0.0112	0.0022	0.0056	-0.0009	-0.0001	0.0073	-0.0027	0.0027	-0.0047
	(0.0039)	(0.0035)	(0.0041)	(0.0049)	(0.0046)	(0.0046)	(0.0041)	(0.0049)	(0.0044)	(0.0060)	(0.0065)	(0.0067)	(0.0070)
61	0.0053	-0.0047	0.0020	0.0023	0.0061	0.0037	0.0082	0.0013	0.0003	0.0019	-0.0026	0.0062	0.0019
	(0.0040)	(0.0029)	(0.0039)	(0.0042)	(0.0040)	(0.0050)	(0.0043)	(0.0047)	(0.0055)	(0.0060)	(0.0056)	(0.0059)	(0.0073)
62	0.0010	-0.0045	0.0017	0.0019	-0.0010	0.0005	0.0043	0.0041	-0.0008	-0.0002	-0.0015	0.0139	0.0087
	(0.0034)	(0.0032)	(0.0029)	(0.0034)	(0.0033)	(0.0040)	(0.0042)	(0.0041)	(0.0049)	(0.0059)	(0.0054)	(0.0061)	(0.0071)
63	-0.0021	-0.0041	0.0020	-0.0008	-0.0044	0.0011	-0.0003	0.0070	0.0036	0.0006	0.0013	0.0125	0.0179
	(0.0031)	(0.0032)	(0.0027)	(0.0029)	(0.0035)	(0.0041)	(0.0046)	(0.0038)	(0.0047)	(0.0053)	(0.0056)	(0.0058)	(0.0060)
64	-0.0053	-0.0038	0.0025	-0.0030	-0.0078	0.0042	-0.0020	0.0096	0.0049	0.0035	0.0049	0.0136	0.0220
	(0.0030)	(0.0030)	(0.0034)	(0.0031)	(0.0044)	(0.0041)	(0.0050)	(0.0039)	(0.0046)	(0.0050)	(0.0057)	(0.0058)	(0.0061)
65	-0.0060	-0.0033	0.0050	-0.0038	-0.0058	0.0044	0.0006	0.0086	0.0036	0.0060	0.0098	0.0128	0.0221
	(0.0029)	(0.0034)	(0.0040)	(0.0032)	(0.0050)	(0.0046)	(0.0054)	(0.0040)	(0.0050)	(0.0054)	(0.0061)	(0.0061)	(0.0060)

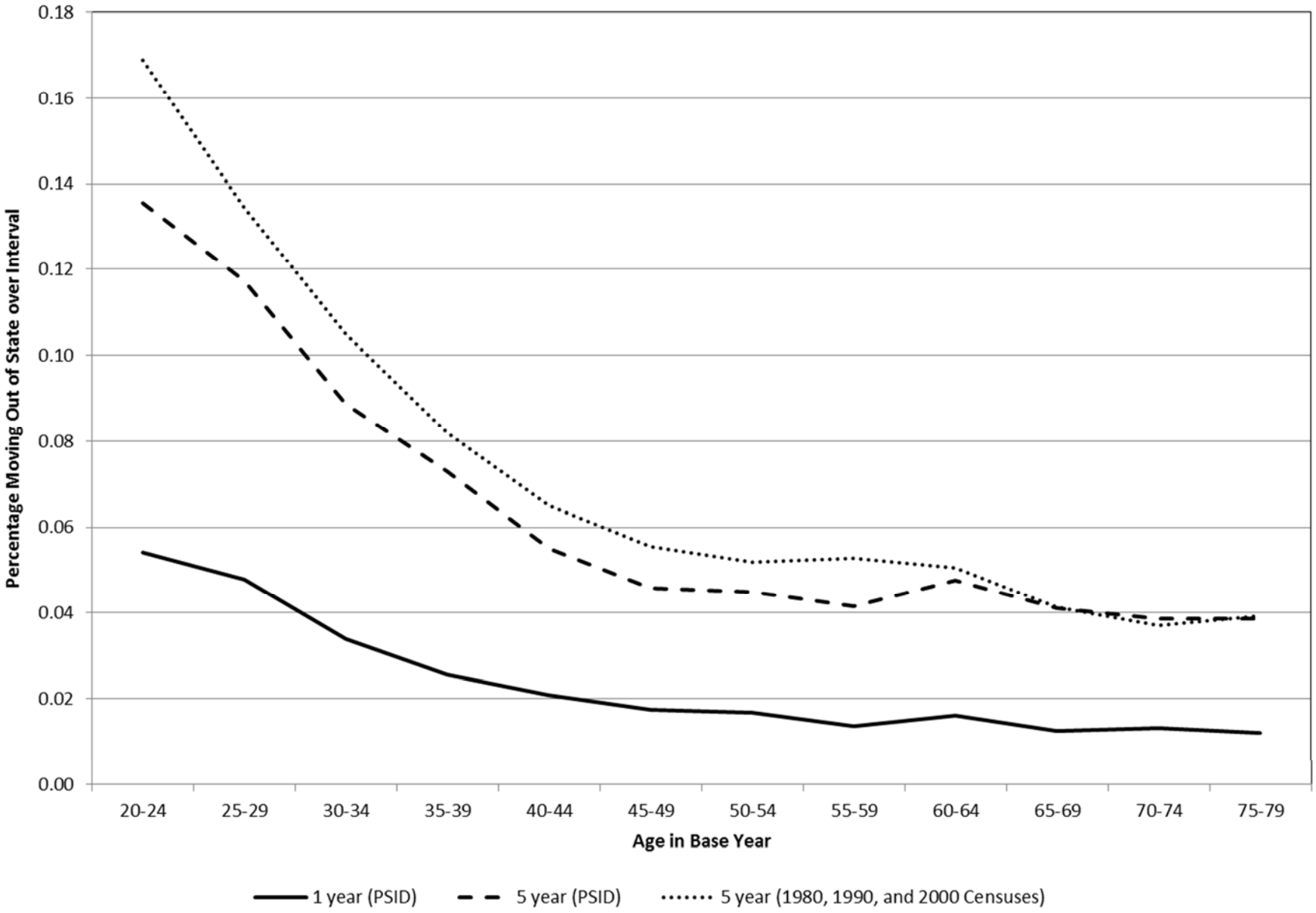
Notes: coefficients and standard errors multiplied by 100; standard errors are shown in parentheses. Every cell in the table represents the coefficient on the unemployment rate in a linear probability model that also includes year fixed effects, state fixed effects, and state-specific linear trends. See paper for more details on these calculations.

Appendix Table 4:
Simulated Impact of Job Loss on Life Expectancy

	A (from Appendix Table 1)	B (from Appendix Table 2)	C = B/.005	D = A + C
Age	observed surv. Prob.	aggregate effect	impact on job loser	simulated surv. Prob.
58	0.987	0.000034	0.0068	0.994
59	0.974	0.000062	0.0124	0.986
60	0.960	0.000050	0.0100	0.970
61	0.946	-0.000028	-0.0056	0.940
62	0.930	-0.000114	-0.0228	0.907
63	0.914	-0.000202	-0.0404	0.874
64	0.897	-0.000290	-0.0580	0.839
65	0.879	-0.000303	-0.0606	0.818
66	0.861	-0.000311	-0.0622	0.799
67	0.842	-0.000361	-0.0722	0.770
68	0.821	-0.000388	-0.0776	0.743
69	0.800	-0.000406	-0.0812	0.719
70	0.778	-0.000529	-0.1058	0.672
71	0.755	-0.000573	-0.1146	0.640
72	0.731	-0.000571	-0.1142	0.617
73	0.705	-0.000560	-0.1120	0.593
74	0.679	-0.000559	-0.1118	0.567
75	0.653	-0.000563	-0.1126	0.540
76	0.625	-0.000575	-0.1150	0.510
77	0.597	-0.000594	-0.1188	0.478
78	0.567	-0.000554	-0.1108	0.456
79	0.537	-0.000514	-0.1028	0.434

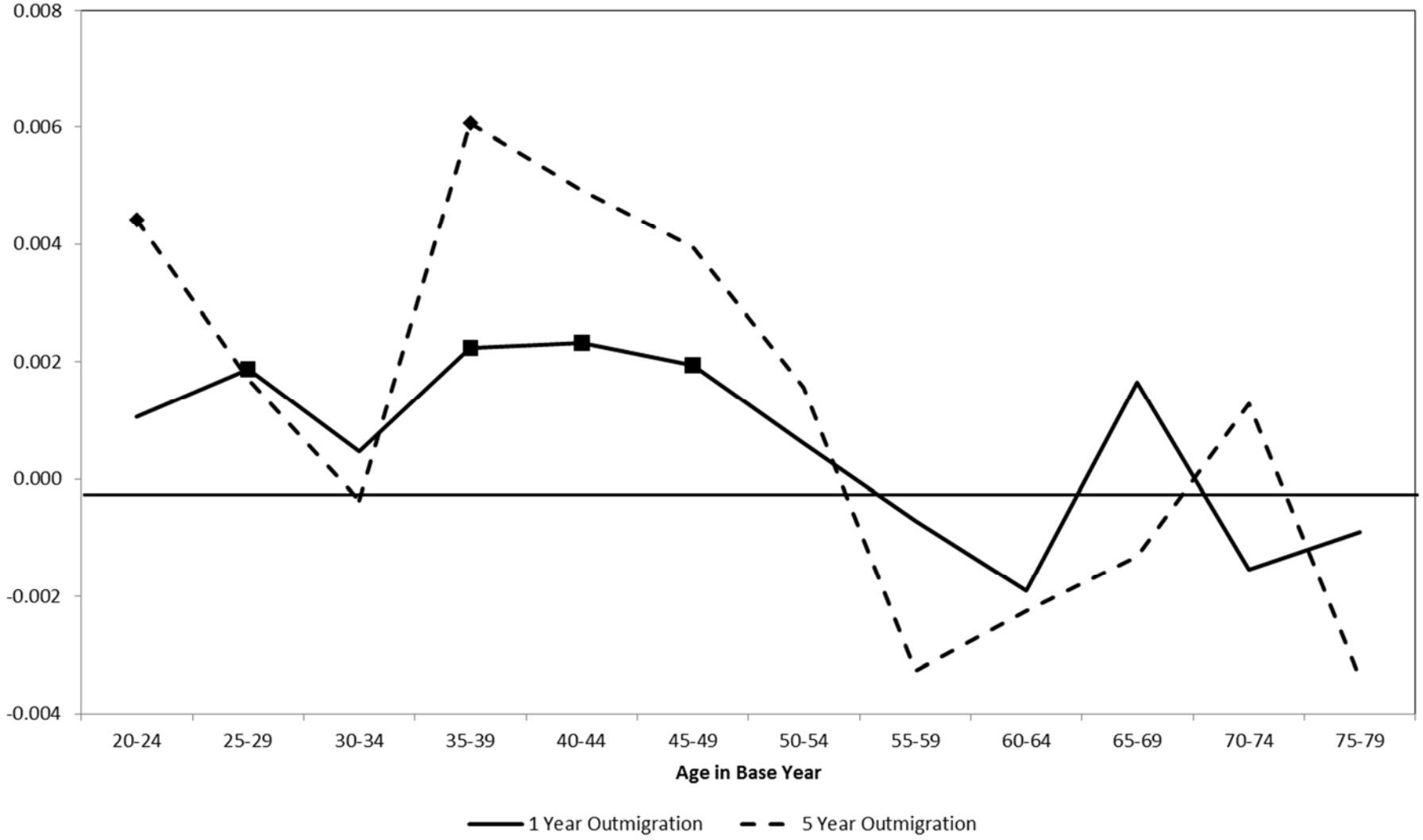
Notes: See “Discussion of Simulated Impact of Job Loss on Longevity to Complement Section IV (“Discussion”)” below for details on these calculations.

Appendix Figure 1: Outmigration Rates, by Age



Note: Authors' calculations from the Panel Study of Income Dynamics (PSID); see paper for details.

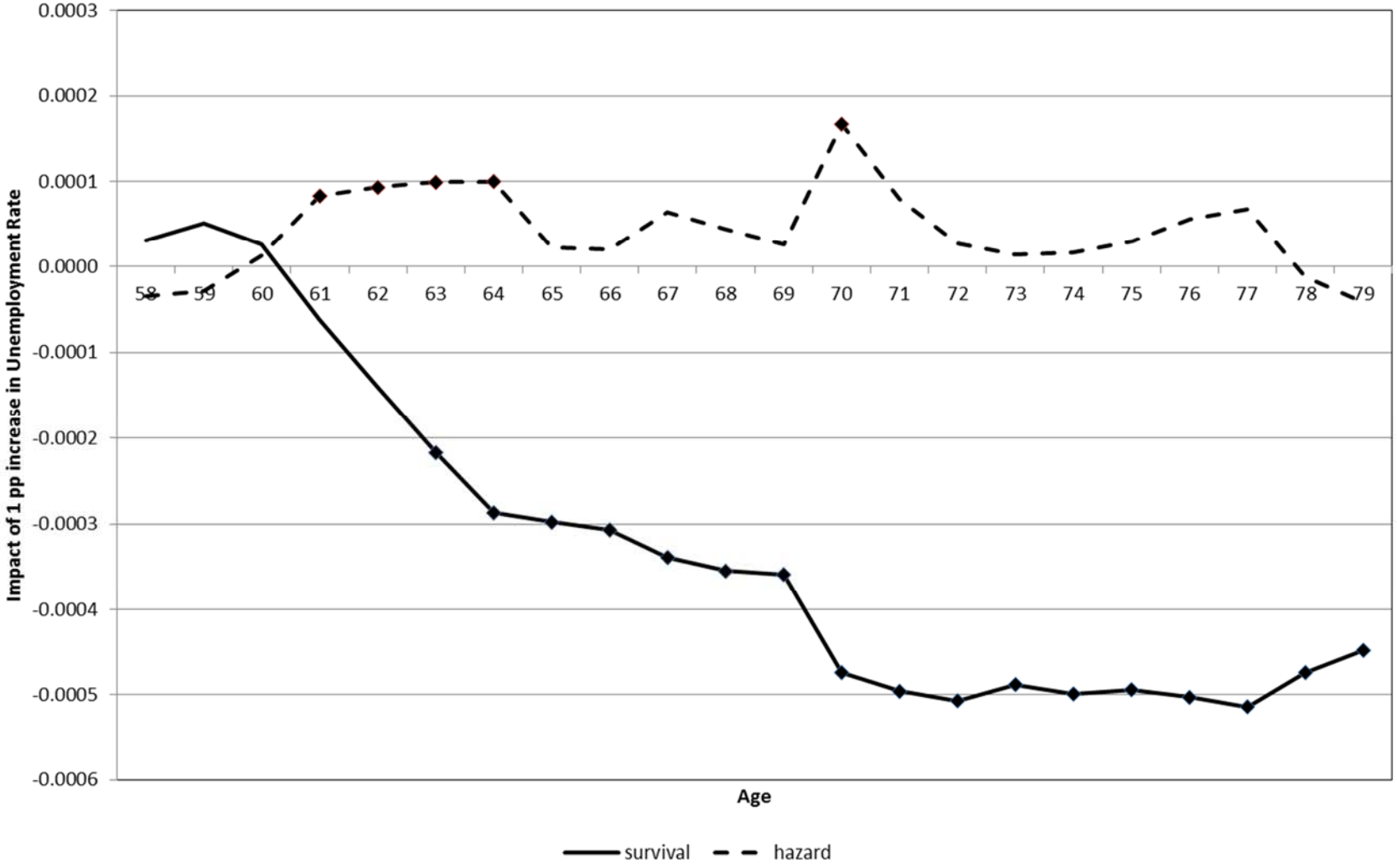
Appendix Figure 2: Impact of Labor Market Conditions on State-Level Outmigration, by Age



note: diamonds represent statistically significant (at the 5% level) estimates.

Note: Authors' calculations from the Panel Study of Income Dynamics (PSID); see paper for details.

Appendix Figure 3: Relationship between Survival and Hazard Estimates in Response to an Unemployment Rate Shock at age 58



note: diamonds reflect statistically significant coefficients.

Note: Authors' calculations from the U.S Vital Statistics data on the universe of death certificates; see paper for details.

Discussion of Out-of-State Migration to Complement Section IIC ("The Role of Migration)

First, we clarify the way in which the survival rates are constructed to identify the specific potential source of bias. We start with a survival rate of one for all birth cohorts in all states starting at age 55. Then we use contemporaneous data on mortality and population to measure the mortality rate in each state and year for each birth cohort. Our mortality data are from the Vital Statistics (which contains data on the universe of death certificates) and our population data are from SEER, which, as we understand it, adjusts inter-Censal interpolations of populations using other data, from sources such as the Social Security Administration and the IRS, to incorporate information on migration. We estimate mortality rates through age 79. Then we use these mortality rates to discount the initial survival rate, so that the $S_a = S_{a-1}(1 - M_a)$ at each age through age 79.

Since the annual mortality rates reflect the ratio of the number of deaths to the size of the population in each year, migration affects both the numerator and denominator in this calculation. Thus, if migration is random with respect to labor market conditions (a big if), it does not pose a problem for our analysis. If, however, the healthy are more likely to migrate in response to local labor market weakness, then outmigration would cause the number of deaths to appear to be artificially high relative to the size of the population. That is a key concern.

Completely addressing this concern is impossible given available data. We have no data source that can plausibly identify all health risks and geographic locations over a long period of time. Instead, we focus on a more primary question. Do older workers' residential locations respond strongly to labor market conditions? If not, then it is unlikely that migration would introduce bias into our results. It is technically still possible for migration to cause bias, if there were heterogeneity in moving propensities across health status that generated no aggregate response, but we believe this problem is second order.

The question that we ask has not been completely resolved in the existing literature. For instance, Saks and Wozniak (2011) state:

> Labor markets in the United States are well known for having a high degree of geographic mobility. Population flows between states far surpass net changes in state populations, suggesting a large degree of churning in geographic relocation patterns (U.S. Bureau of the Census 2003). Many factors influence migration rates, including the age distribution of the population, heterogeneous preferences for local amenities, and changes in local housing markets. Spatial differences in local labor demand also contribute to worker relocation, although evidence suggests that labor markets explain only a small portion of total migration flows (Gabriel, Shack-Marquez, and Wascher 1993; Bound and Holzer 2000; Davies, Greenwood, and Li 2001; Wozniak 2008).

This does not address the interaction between labor market conditions and age in predicting migration.

We have conducted our own empirical exercise designed to address this question using data from the PSID. The PSID began tracking a cohort of individuals in 1968 and it has continued through the present (2009 is the latest data available). Over time, some attrition has occurred and new households have been added as children grew up, married, had children themselves, etc. We used all available individuals in those data and tracked outmigration by state over a one and five year period. We then assign to each individual the state unemployment rate that they would have faced in the

base year of the migration calculation (i.e. year t-5 when looking at 5 year outmigration). We focus on differences in outmigration rates by age as a function of local labor market conditions. In practice, this means that we run regressions of the following form:

$$m_{stja} = \beta_{0a} + \beta_{1a} UR_{s,t-j} + \gamma_{s,a} + \gamma_{t,a} + \varepsilon_{stja}$$

In this model, a unit of observation is a state/year cell; individual observations on outmigration are aggregated to construct outmigration rates. The dependent variable is the migration rate out of state s between periods t-j (where j is the period over which migration is measured - i.e. one or five years) and t, and UR is the unemployment rate in state s at time t-j. We also include fixed effects for years and states (measured in the base year, t-j). We estimate this model separately for individuals in five year age categories running from 20-24 to 75-79 to determine whether or not the responsiveness of migration to state labor market conditions differs by age.[1]

Before reporting the results of this analysis, we first provide descriptive statistics to provide an indication that the data we are using is comparable to that from other sources. The results of this analysis are provided in Appendix Figure 1 (see above). As one would suspect, outmigration rates are considerably higher at younger ages and stabilize at a considerably lower level by the time individuals hit their 40s or certainly their 50s. The relationship between outmigration rates calculated from the PSID and the Census over five year intervals are sufficiently comparable to validate the use of these data.

Rather than reporting a full table of regression results, we have chosen to graphically display the coefficients, β_1, over five year intervals. Appendix Figure 2 (see above) collapses the results of 24 separate regressions of the model previously specified where each point represents an estimate of β_1 for each five year age group separately for one year and five year outmigration. Diamonds reflect statistically significant (at the 5% level) coefficients. Although there is some variation from age group to age group, it is clear that only "younger" (under age 50) workers leave a state when the labor market is weak. For instance, a one percentage point increase in the unemployment rate in a state/year is predicted to increase the five-year outmigration rate of 35-39 year olds by 0.6 percentage points, which represents an 8 percent rise relative to the base rate of 7.3 percentage points. This is a modest relative increase in outmigration, but it is small relative to the size of the population. As for older workers, and particularly those above age 55 that we consider in our main analysis, these results provide no indication that migration is substantially affected by labor market fluctuations. All of the coefficients are insignificant and point estimates for those in these age categories fluctuate around zero.

[1] We have aggregated the ages into five-year categories because each individual is recorded only once when we measure five year migration. This is important for standard error calculations. This also means that when we use single year migration, individuals are observed up to five times in each regression, which creates problems in the calculation of our standard errors. We have also estimated single year outmigration rates by single year of age, and the qualitative nature of the results do not change from those that we report here. We have chosen to take the approach used here simply for ease of exposition.

We conclude from this exercise that it is unlikely that our results regarding the relationship between labor market conditions and longevity are driven by migration.

References:

Saks, Raven E. and Abigail Wozniak. 2011. "Labor Reallocation Over the Business Cycle: New Evidence from Internal Migration." Journal of Labor Economics 29(4): 697-739.

Discussion of Simulated Impact of Job Loss on Longevity
to Complement Section IV ("Discussion)

In the discussion section, we say "These calculations suggest that a worker who lost his or her job at age 58 as a result of a recession could be expected to live 3 fewer years (19 instead of 22) as a result." We now provide an explanation of how we arrived at this estimate.

We begin with the survival probabilities that are reported in Appendix Table 1 for age 58 (these start at .987 and fall to .539 by age 79. This statistic falls under .5 at age 80, so life expectancy at age 58 for this sample is 22 years – see Column A in Appendix Table 4).

Then we record the impact on survival at ages 58 through 79 that results from a 1 percentage point increase the unemployment rate at age 58. These statistics are taken from Appendix Table 2, starting at 0.0034 and moving to -0.0514 at ages 58 and 79, respectively. They are reported in Column B in Appendix Table 4 (note that they are taken directly from the regression results and are not multiplied by 100).

Next we record the impact of a one percentage point increase in the unemployment rate on the probability of employment based on the results in Table 2 at ages 56-58, which is -0.5 (a one percentage point increase in the unemployment rate reduces the likelihood of employment by 0.5 percentage points for workers in this age group).

We then convert our estimates of the impact on survival at each age to estimates of per job loser survival effects, by dividing the aggregate effect on survival (in Column B) by the aggregate effect on employment (i.e. 0.0034/0.5 = 0.0068). This is displayed in Column C.

Adding this estimated change in survival probabilities to the baseline survival probabilities provides an estimate of simulated survival probabilities for affected job losers. At age 58, for example, the simulated survival probability changes to 0.994 from the actual survival probability of 0.987). If we follow these steps at each age, we can construct a series of simulated survival probabilities. These values are reported in Column D and are calculated as the values in Column A plus the values in Column C.

In this simulation, the median age of death is 77. This reduction in life expectancy from 80 to 77 is the source of our three-year estimate.