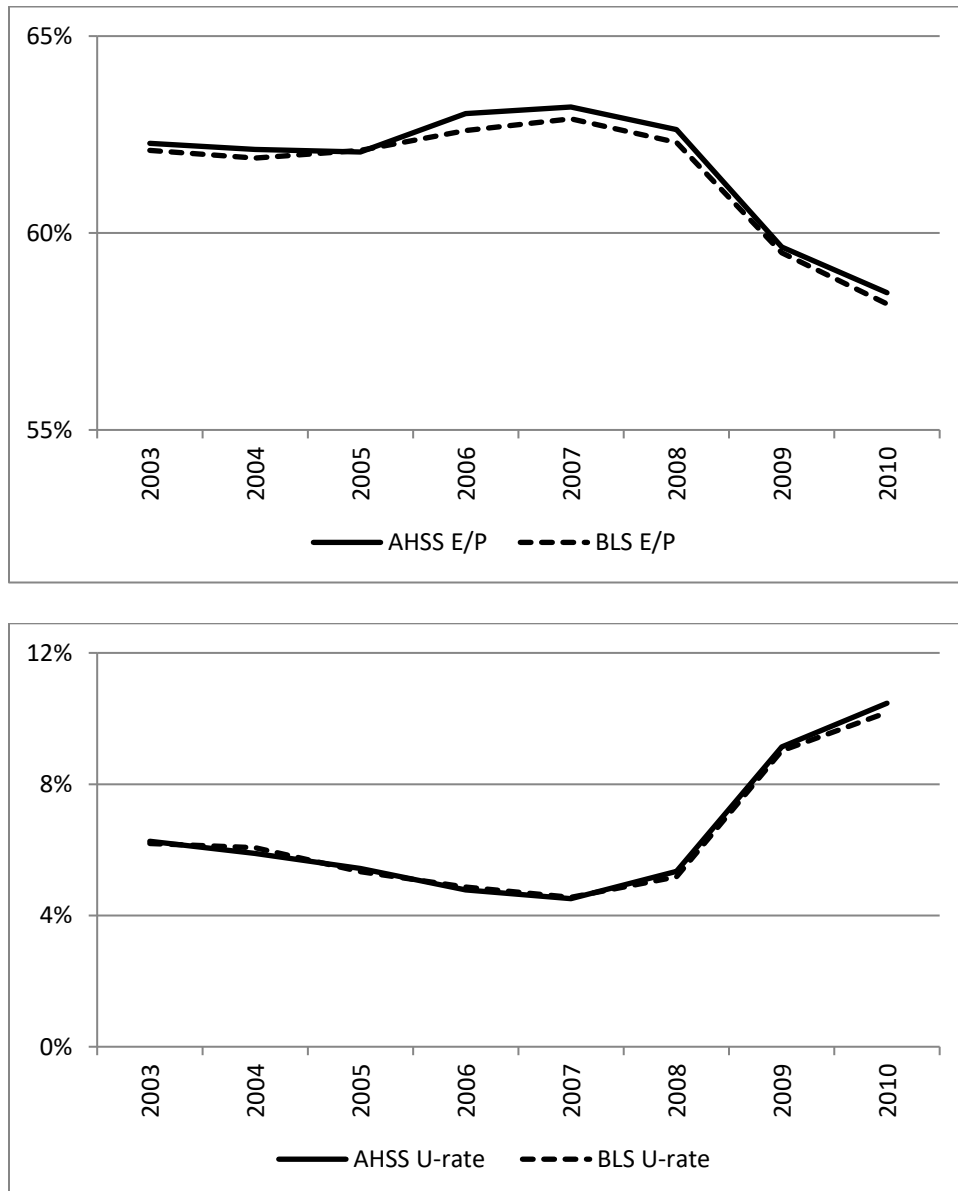# The Consequences of Long-Term Unemployment: Evidence from Linked Survey and Administrative Data

Katharine G. Abraham, John Haltiwanger, Kristin Sandusky, and James R. Spletzer
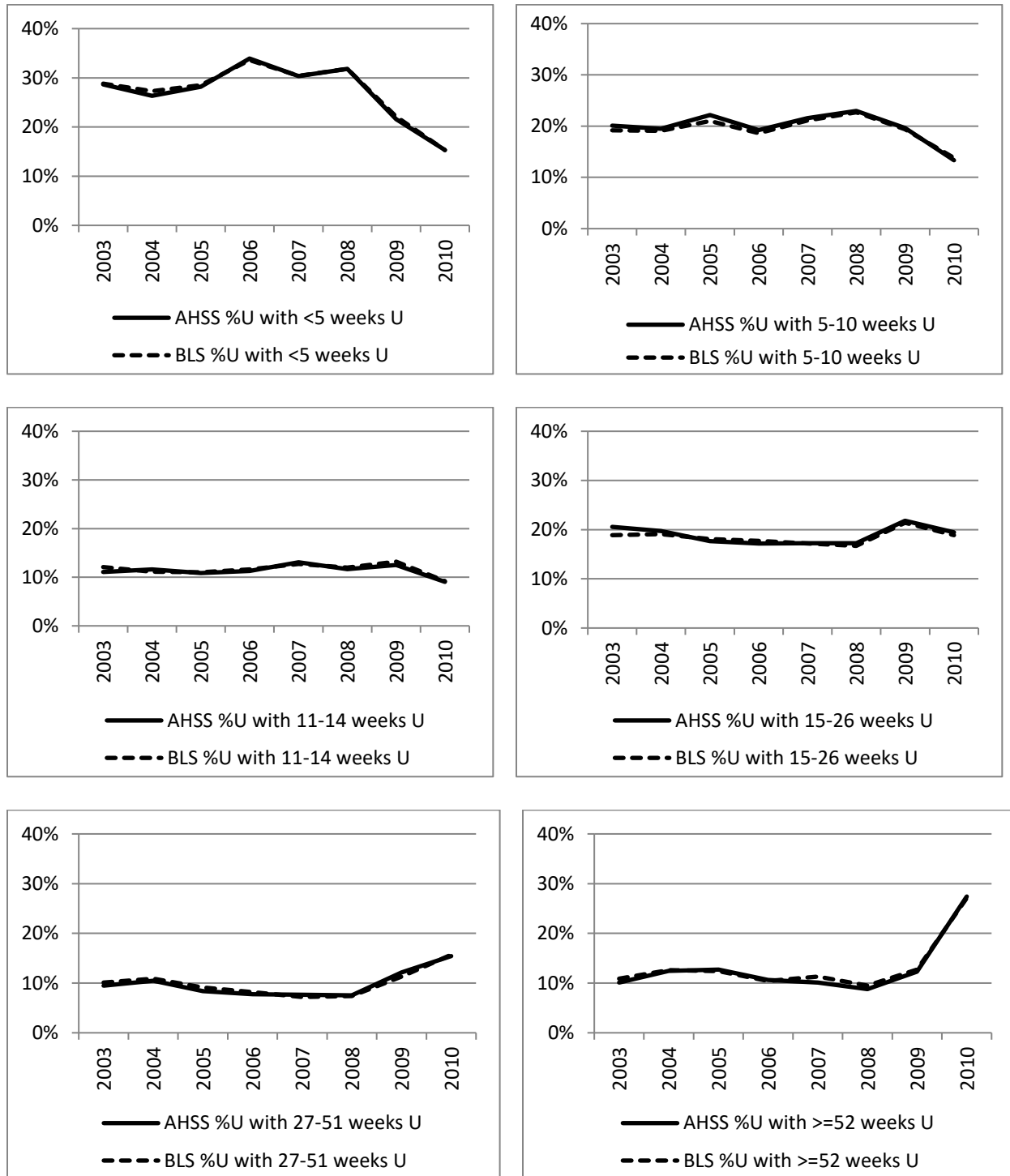
Figure A.1. Employment-to-Population Rate and Unemployment Rate, 2003–2010

Source: National estimates from the Bureau of Labor Statistics website, based on Labstat series LNU00000000, LNU02000000, and LNU0300000.
Notes: CPS-LEHD weighted microdata for residents of 31 states ("AHSS").
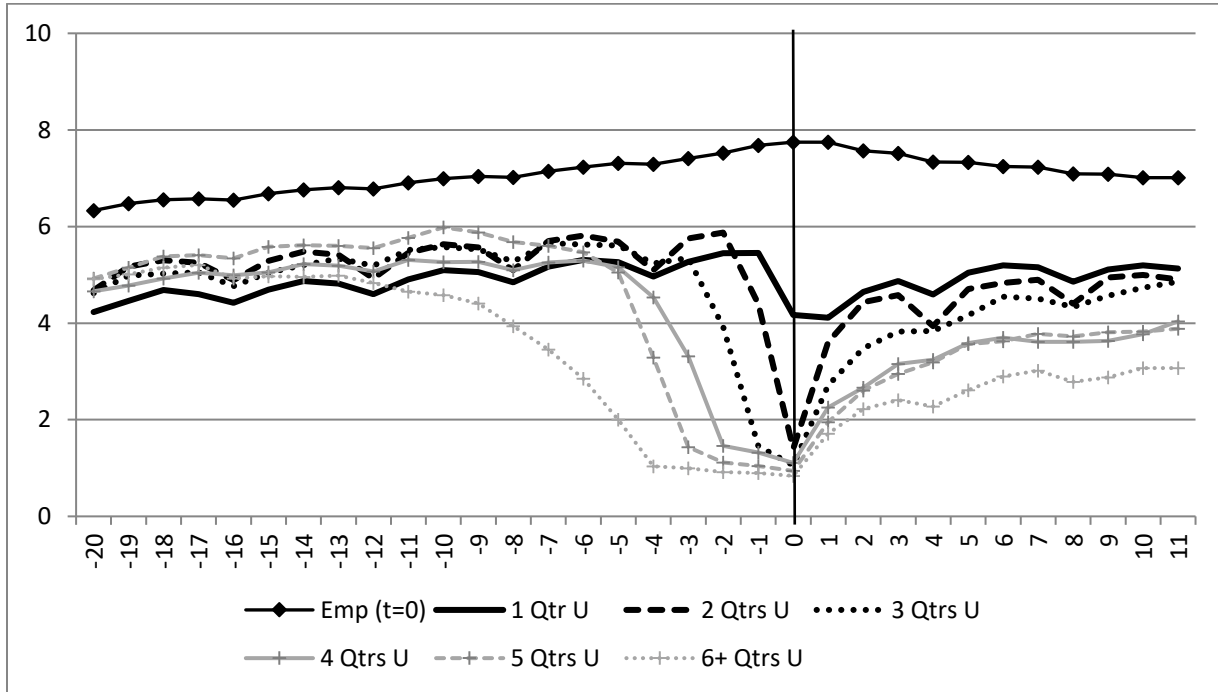
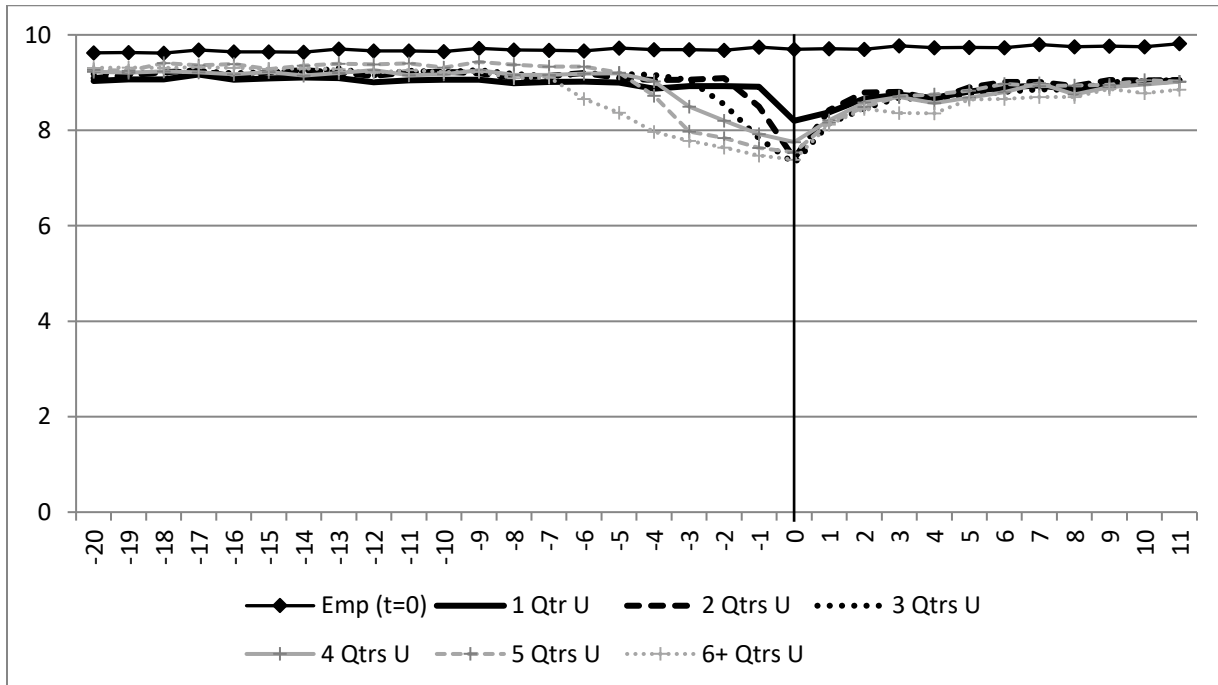**Figure A.2. Duration of Unemployment, 2003–2010**

Source: National estimates from the Bureau of Labor Statistics website, based on Labstat series LNU03008396, LNU03008756, LNU03008816, LNU03008876, LNU03008936, and LNU03008696.
Notes: CPS-LEHD weighted microdata for residents of 31 states ("AHSS").

Figure A.3A. Real Earnings (IHS Earnings ≥ 0)

Figure A.3B. Real Earnings (IHS Earnings > 0)

Notes: Left axis is weighted IHS(UI earnings) of March Current Population Survey (CPS) respondents in linked sample with indicated labor force status as of $q = 0$, the quarter of the CPS interview. Estimates in top panel include those with zero earnings in a given quarter; estimates in bottom panel do not. IHS, Inverse Hyperbolic Sine; UI, unemployment insurance.

Figure A.4. Employment Probabilities, by Age {< 30, 30–49, ≥ 50}

Age < 30

Age 30–49

Figure A.4. Continued

Age ≥ 50

Notes: Left axis is weighted UI employment rate of March Current Population Survey (CPS) respondents in linked sample with indicated labor force status as of $q = 0$, the quarter of the CPS interview. NILF, not in the labor force; UI, unemployment insurance.

Figure A.5. Employment Probabilities, by Reason for U {Job Loser, Other EU, NU}

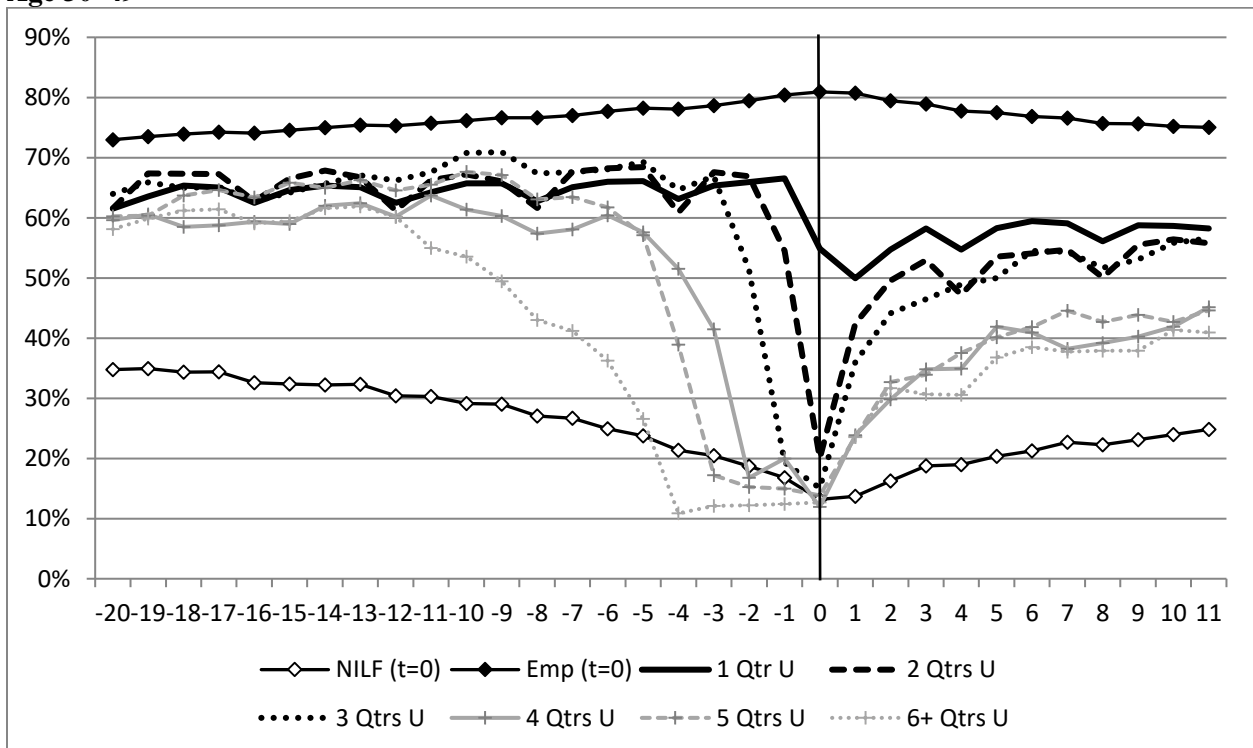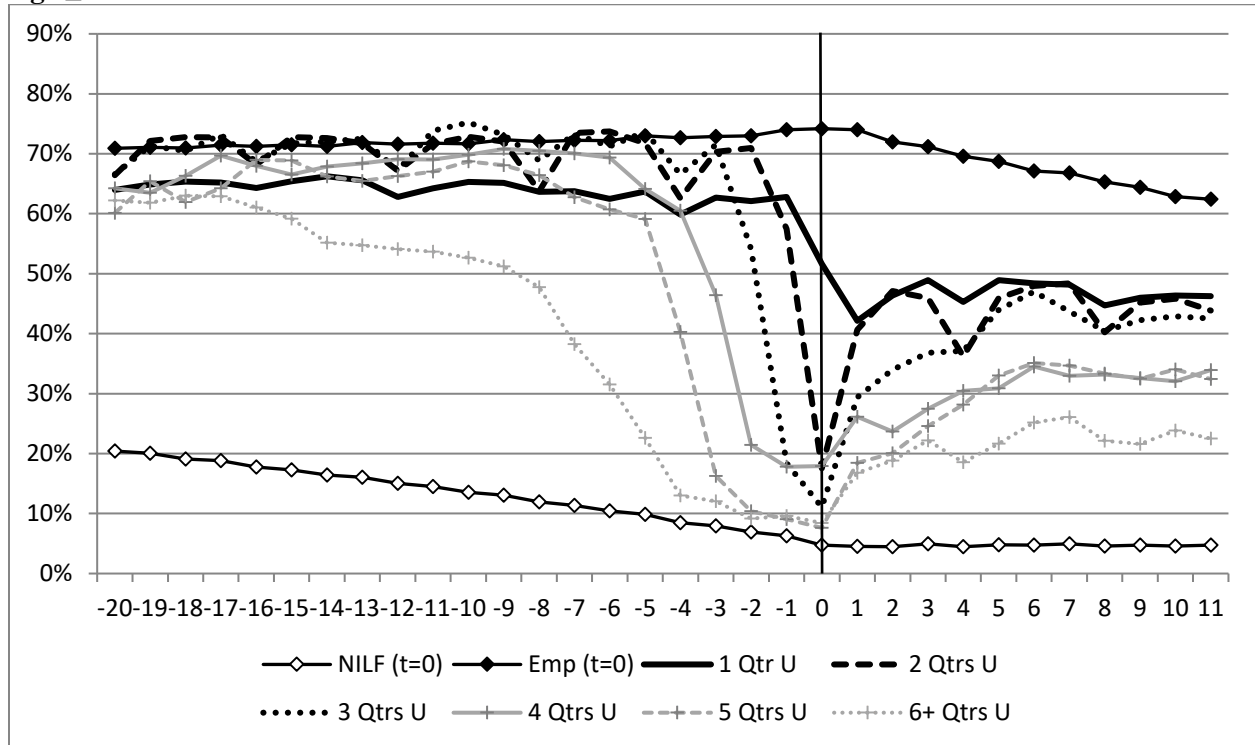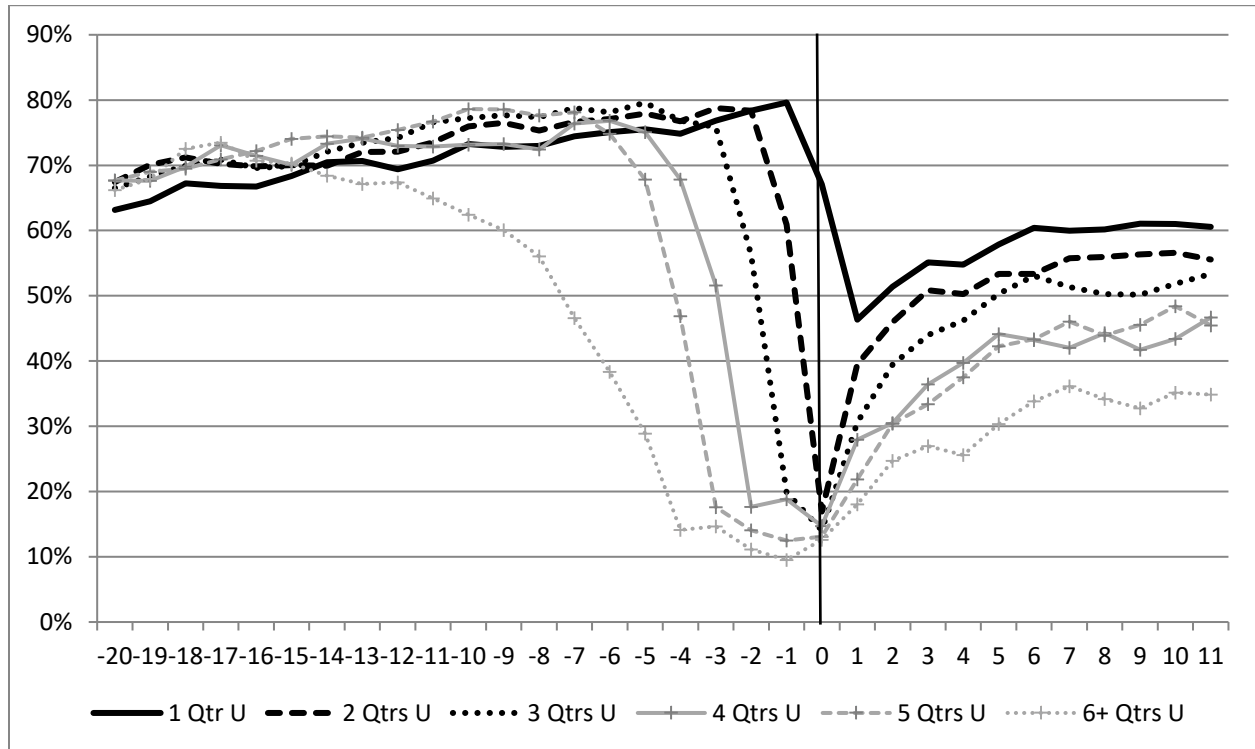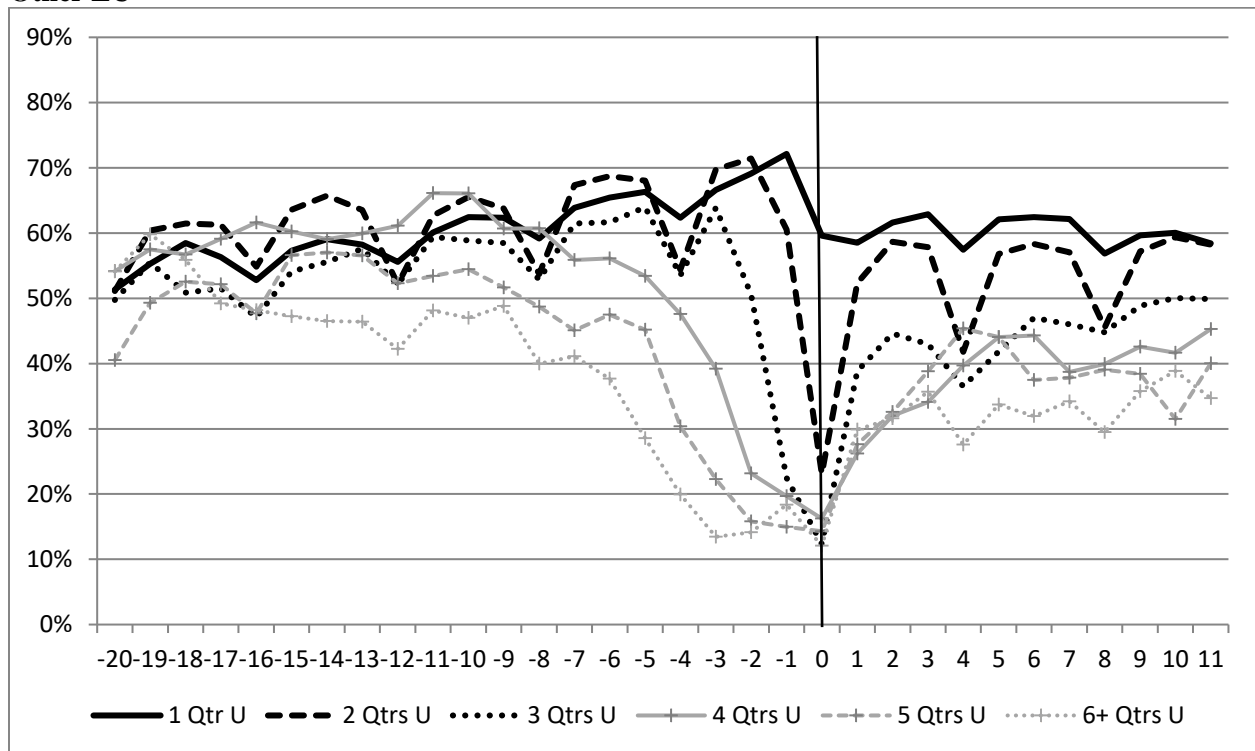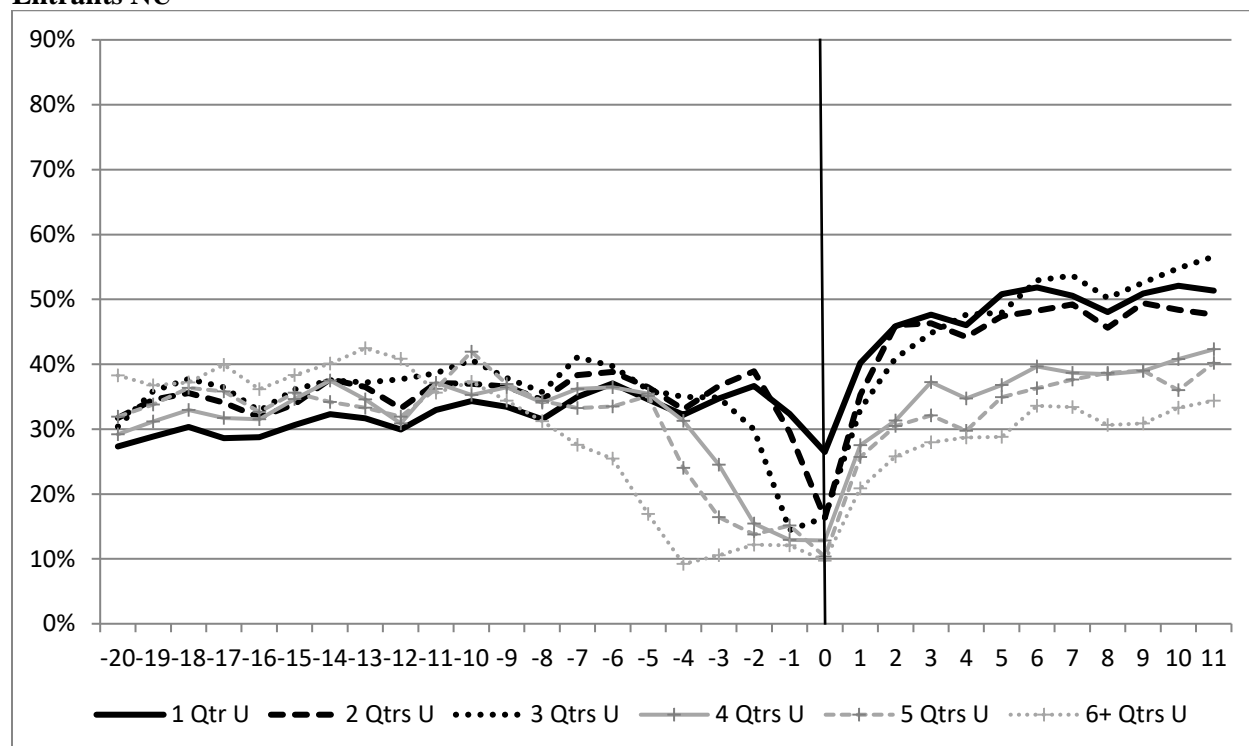**Job Loser**

Other EU

Figure A.5. Continued

Entrants NU

Notes: Left axis is weighted UI employment rate of March Current Population Survey (CPS) respondents in linked sample with indicated labor force status as of *q* = 0, the quarter of the CPS interview. NILF, not in the labor force; UI, unemployment insurance.

Table A.1. Employment Probability Regressions with State Employment Growth Rates

	(1)	(2)	(3)	(4)	(5)	(6)
δ parameters ($q = -8$)						
$\delta_{d=0,q=-8}$	0.7251	0.7235	0.7191	0.7224	0.7169	0.7163
$\delta_{d=1,q=-8}$	0.5397	0.5654	0.6321	0.5884	0.6715	0.6810
$\delta_{d=2,q=-8}$	0.5604	0.5795	0.6266	0.5918	0.6504	0.6599
$\delta_{d=3,q=-8}$	0.5754	0.5958	0.6479	0.6097	0.6745	0.6782
$\delta_{d=4,q=-8}$	0.5570	0.5749	0.6460	0.5796	0.6680	0.6746
$\delta_{d=5,q=-8}$	0.6062	0.6171	0.6732	0.6153	0.6851	0.6816
$\delta_{d=6,q=-8}$	0.4333	0.4557	0.5522	0.4513	0.5714	0.6105
δ parameters ($q = +8$)						
$\delta_{d=0,q=+8}$	0.7271	0.7256	0.7212	0.7267	0.7234	0.7232
$\delta_{d=1,q=+8}$	0.5491	0.5748	0.6415	0.5517	0.6021	0.6049
$\delta_{d=2,q=+8}$	0.4935	0.5126	0.5597	0.5003	0.5359	0.5387
$\delta_{d=3,q=+8}$	0.4903	0.5106	0.5627	0.4967	0.5361	0.5372
$\delta_{d=4,q=+8}$	0.4132	0.4312	0.5022	0.4265	0.4801	0.4821
$\delta_{d=5,q=+8}$	0.4172	0.4281	0.4842	0.4300	0.4724	0.4713
$\delta_{d=6,q=+8}$	0.3202	0.3426	0.4391	0.3470	0.4199	0.4314
$q = +8$ Employment differences						
Diff21: $\delta_{d=2,q=+8} - \delta_{d=1,q=+8}$	−0.0555	−0.0621	−0.0817	−0.0514	−0.0662	−0.0662
Diff31: $\delta_{d=3,q=+8} - \delta_{d=1,q=+8}$	−0.0588	−0.0641	−0.0787	−0.0549	−0.0660	−0.0677
Diff41: $\delta_{d=4,q=+8} - \delta_{d=1,q=+8}$	−0.1359	−0.1436	−0.1393	−0.1252	−0.1219	−0.1228
Diff51: $\delta_{d=5,q=+8} - \delta_{d=1,q=+8}$	−0.1319	−0.1466	−0.1572	−0.1217	−0.1297	−0.1335
Diff61: $\delta_{d=6,q=+8} - \delta_{d=1,q=+8}$	−0.2289	−0.2322	−0.2024	−0.2047	−0.1822	−0.1735
Employment losses						
Loss0: $\delta_{d=0,q=+8} - \delta_{d=0,q=-8}$	0.0020	0.0020	0.0020	0.0043	0.0064	0.0069
Loss1: $\delta_{d=1,q=+8} - \delta_{d=1,q=-8}$	0.0094	0.0094	0.0094	−0.0368	−0.0694	−0.0761
Loss2: $\delta_{d=2,q=+8} - \delta_{d=2,q=-8}$	−0.0668	−0.0668	−0.0668	−0.0915	−0.1145	−0.1212
Loss3: $\delta_{d=3,q=+8} - \delta_{d=3,q=-8}$	−0.0851	−0.0851	−0.0851	−0.1129	−0.1384	−0.1410
Loss4: $\delta_{d=4,q=+8} - \delta_{d=4,q=-8}$	−0.1438	−0.1438	−0.1438	−0.1531	−0.1879	−0.1925
Loss5: $\delta_{d=5,q=+8} - \delta_{d=5,q=-8}$	−0.1890	−0.1890	−0.1890	−0.1853	−0.2127	−0.2102
Loss6: $\delta_{d=6,q=+8} - \delta_{d=6,q=-8}$	−0.1132	−0.1132	−0.1132	−0.1043	−0.1515	−0.1792
Employment loss differences						
LossDiff21: Loss2 − Loss1	−0.0762	−0.0762	−0.0762	−0.0547	−0.0451	−0.0451
LossDiff31: Loss3 − Loss1	−0.0945	−0.0945	−0.0945	−0.0762	−0.0690	−0.0649
LossDiff41: Loss4 − Loss1	−0.1532	−0.1532	−0.1532	−0.1164	−0.1185	−0.1164
LossDiff51: Loss5 − Loss1	−0.1984	−0.1984	−0.1984	−0.1485	−0.1434	−0.1341
LossDiff61: Loss6 − Loss1	−0.1226	−0.1226	−0.1226	−0.0675	−0.0821	−0.1030
R-squared	0.0131	0.0377	0.3600	0.0475	0.3891	0.4389
CPS demographics controls		Yes	Yes	Yes	Yes	Yes
Year dummy controls		Yes	Yes	Yes	Yes	Yes
Work history controls			Yes		Yes	Yes
Work trajectory controls						Yes
State %Emp Change	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient vector β or β(q)	β	β	β	β(q)	β(q)	β(q)

Notes: Sample is 285,741 persons who are employed or unemployed in CPS at $q = 0$ and for whom a PIK is available for linking to the LEHD. Number of observations in regression is 571,482. All control variables are deviations from means. Dependent variable is {0,1} employment indicator; mean = 0.7130. All estimated δ parameters are statistically different from zero. Gray shading in the lower three panels

indicates reported estimate is statistically significant at the 0.01 level. CPS, Current Population Survey; LEHD, Longitudinal Employer-Household Dynamics; PIK, Protected Identification Key.

Table A.2. Employment Probability Regressions with State by Industry Employment Growth Rates

	(1)	(2)	(3)	(4)	(5)	(6)
δ parameters ($q = -8$)						
$\delta_{d=0,q=-8}$	0.7253	0.7237	0.7192	0.7226	0.7170	0.7163
$\delta_{d=1,q=-8}$	0.5380	0.5641	0.6319	0.5863	0.6706	0.6802
$\delta_{d=2,q=-8}$	0.5576	0.5780	0.6262	0.5895	0.6494	0.6590
$\delta_{d=3,q=-8}$	0.5718	0.5938	0.6474	0.6065	0.6732	0.6770
$\delta_{d=4,q=-8}$	0.5526	0.5723	0.6455	0.5752	0.6662	0.6731
$\delta_{d=5,q=-8}$	0.6010	0.6143	0.6727	0.6108	0.6833	0.6800
$\delta_{d=6,q=-8}$	0.4301	0.4541	0.5518	0.4487	0.5702	0.6094
δ parameters ($q = +8$)						
$\delta_{d=0,q=+8}$	0.7273	0.7257	0.7212	0.7267	0.7233	0.7231
$\delta_{d=1,q=+8}$	0.5473	0.5735	0.6413	0.5513	0.6026	0.6054
$\delta_{d=2,q=+8}$	0.4908	0.5112	0.5594	0.4997	0.5362	0.5390
$\delta_{d=3,q=+8}$	0.4867	0.5086	0.5622	0.4959	0.5365	0.5376
$\delta_{d=4,q=+8}$	0.4088	0.4285	0.5017	0.4255	0.4809	0.4829
$\delta_{d=5,q=+8}$	0.4120	0.4253	0.4837	0.4289	0.4730	0.4721
$\delta_{d=6,q=+8}$	0.3170	0.3409	0.4386	0.3463	0.4202	0.4318
$q = +8$ Employment differences						
Diff21: $\delta_{d=2,q=+8} - \delta_{d=1,q=+8}$	−0.0566	−0.0623	−0.0819	−0.0516	−0.0664	−0.0664
Diff31: $\delta_{d=3,q=+8} - \delta_{d=1,q=+8}$	−0.0606	−0.0649	−0.0790	−0.0554	−0.0661	−0.0678
Diff41: $\delta_{d=4,q=+8} - \delta_{d=1,q=+8}$	−0.1386	−0.1450	−0.1396	−0.1258	−0.1216	−0.1225
Diff51: $\delta_{d=5,q=+8} - \delta_{d=1,q=+8}$	−0.1354	−0.1482	−0.1576	−0.1224	−0.1295	−0.1333
Diff61: $\delta_{d=6,q=+8} - \delta_{d=1,q=+8}$	−0.2304	−0.2326	−0.2026	−0.2050	−0.1824	−0.1736
Employment Losses						
Loss0: $\delta_{d=0,q=+8} - \delta_{d=0,q=-8}$	0.0020	0.0020	0.0020	0.0041	0.0063	0.0068
Loss1: $\delta_{d=1,q=+8} - \delta_{d=1,q=-8}$	0.0094	0.0094	0.0094	−0.0351	−0.0680	−0.0748
Loss2: $\delta_{d=2,q=+8} - \delta_{d=2,q=-8}$	−0.0668	−0.0668	−0.0668	−0.0898	−0.1132	−0.1200
Loss3: $\delta_{d=3,q=+8} - \delta_{d=3,q=-8}$	−0.0851	−0.0851	−0.0851	−0.1107	−0.1367	−0.1394
Loss4: $\delta_{d=4,q=+8} - \delta_{d=4,q=-8}$	−0.1438	−0.1438	−0.1438	−0.1497	−0.1853	−0.1901
Loss5: $\delta_{d=5,q=+8} - \delta_{d=5,q=-8}$	−0.1890	−0.1890	−0.1890	−0.1819	−0.2103	−0.2079
Loss6: $\delta_{d=6,q=+8} - \delta_{d=6,q=-8}$	−0.1132	−0.1132	−0.1132	−0.1025	−0.1500	−0.1777
Employment Loss Differences						
LossDiff21: Loss2 − Loss1	−0.0762	−0.0762	−0.0762	−0.0547	−0.0452	−0.0452
LossDiff31: Loss3 − Loss1	−0.0945	−0.0945	−0.0945	−0.0756	−0.0687	−0.0646
LossDiff41: Loss4 − Loss1	−0.1532	−0.1532	−0.1532	−0.1147	−0.1173	−0.1153
LossDiff51: Loss5 − Loss1	−0.1984	−0.1984	−0.1984	−0.1469	−0.1423	−0.1331
LossDiff61: Loss6 − Loss1	−0.1225	−0.1225	−0.1225	−0.0674	−0.0820	−0.1028
R-squared	0.0143	0.0390	0.3600	0.0495	0.3894	0.4392
CPS demographics controls		Yes	Yes	Yes	Yes	Yes
Year dummy controls		Yes	Yes	Yes	Yes	Yes
Work history controls			Yes		Yes	Yes
Work trajectory controls						Yes
State-Industry %Emp Change	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient vector β or β(q)	β	β	β	β(q)	β(q)	β(q)

Notes: Sample is 285,741 persons who are employed or unemployed in CPS at $q = 0$ and for whom a PIK is available for linking to the LEHD. Number of observations in regression is 571,482. All control variables are deviations from means. Dependent variable is {0,1} employment indicator; mean = 0.7130. All estimated δ parameters are statistically different from zero. Gray shading in the lower three panels

indicates reported estimate is statistically significant at the 0.01 level. CPS, Current Population Survey; LEHD, Longitudinal Employer-Household Dynamics; PIK, Protected Identification Key.

Table A.3. Employment Probability Regressions with State by Industry Employment Growth Rates, Interacted with Whether Employed or Unemployed at $q = 0$

	(1)	(2)	(3)	(4)	(5)	(6)
δ parameters ($q = -8$)						
$\delta_{d=0,q=-8}$	0.7257	0.7241	0.7193	0.7234	0.7175	0.7167
$\delta_{d=1,q=-8}$	0.5327	0.5589	0.6304	0.5768	0.6656	0.6762
$\delta_{d=2,q=-8}$	0.5507	0.5713	0.6242	0.5772	0.6429	0.6538
$\delta_{d=3,q=-8}$	0.5636	0.5858	0.6451	0.5918	0.6655	0.6707
$\delta_{d=4,q=-8}$	0.5429	0.5629	0.6428	0.5580	0.6572	0.6658
$\delta_{d=5,q=-8}$	0.5901	0.6038	0.6696	0.5915	0.6732	0.6718
$\delta_{d=6,q=-8}$	0.4226	0.4468	0.5496	0.4353	0.5631	0.6037
δ parameters ($q = +8$)						
$\delta_{d=0,q=+8}$	0.7278	0.7261	0.7213	0.7268	0.7232	0.7229
$\delta_{d=1,q=+8}$	0.5421	0.5683	0.6398	0.5504	0.6045	0.6077
$\delta_{d=2,q=+8}$	0.4839	0.5045	0.5574	0.4986	0.5387	0.5419
$\delta_{d=3,q=+8}$	0.4785	0.5007	0.5599	0.4946	0.5395	0.5411
$\delta_{d=4,q=+8}$	0.3991	0.4191	0.4990	0.4240	0.4845	0.4870
$\delta_{d=5,q=+8}$	0.4011	0.4148	0.4806	0.4272	0.4770	0.4766
$\delta_{d=6,q=+8}$	0.3094	0.3336	0.4365	0.3451	0.4230	0.4350
$q = +8$ Employment Differences						
Diff21: $\delta_{d=2,q=+8} - \delta_{d=1,q=+8}$	−0.0582	−0.0639	−0.0823	−0.0518	−0.0658	−0.0658
Diff31: $\delta_{d=3,q=+8} - \delta_{d=1,q=+8}$	−0.0636	−0.0677	−0.0798	−0.0558	−0.0650	−0.0666
Diff41: $\delta_{d=4,q=+8} - \delta_{d=1,q=+8}$	−0.1430	−0.1492	−0.1408	−0.1264	−0.1200	−0.1207
Diff51: $\delta_{d=5,q=+8} - \delta_{d=1,q=+8}$	−0.1410	−0.1535	−0.1591	−0.1232	−0.1275	−0.1310
Diff61: $\delta_{d=6,q=+8} - \delta_{d=1,q=+8}$	−0.2327	−0.2347	−0.2033	−0.2054	−0.1815	−0.1727
Employment Losses						
Loss0: $\delta_{d=0,q=+8} - \delta_{d=0,q=-8}$	0.0020	0.0020	0.0020	0.0034	0.0057	0.0063
Loss1: $\delta_{d=1,q=+8} - \delta_{d=1,q=-8}$	0.0094	0.0094	0.0094	−0.0264	−0.0610	−0.0685
Loss2: $\delta_{d=2,q=+8} - \delta_{d=2,q=-8}$	−0.0668	−0.0668	−0.0668	−0.0785	−0.1042	−0.1119
Loss3: $\delta_{d=3,q=+8} - \delta_{d=3,q=-8}$	−0.0851	−0.0851	−0.0851	−0.0972	−0.1260	−0.1297
Loss4: $\delta_{d=4,q=+8} - \delta_{d=4,q=-8}$	−0.1438	−0.1438	−0.1438	−0.1340	−0.1727	−0.1787
Loss5: $\delta_{d=5,q=+8} - \delta_{d=5,q=-8}$	−0.1890	−0.1890	−0.1890	−0.1643	−0.1962	−0.1952
Loss6: $\delta_{d=6,q=+8} - \delta_{d=6,q=-8}$	−0.1132	−0.1132	−0.1132	−0.0902	−0.1401	−0.1687
Employment Loss Differences						
LossDiff21: Loss2 − Loss1	−0.0762	−0.0762	−0.0762	−0.0522	−0.0432	−0.0434
LossDiff31: Loss3 − Loss1	−0.0945	−0.0945	−0.0945	−0.0708	−0.0650	−0.0612
LossDiff41: Loss4 − Loss1	−0.1532	−0.1532	−0.1532	−0.1076	−0.1117	−0.1102
LossDiff51: Loss5 − Loss1	−0.1984	−0.1984	−0.1984	−0.1379	−0.1351	−0.1267
LossDiff61: Loss6 − Loss1	−0.1226	−0.1225	−0.1225	−0.0638	−0.0791	−0.1002
R-squared	0.0147	0.0392	0.3600	0.0500	0.3896	0.4393
CPS demographics controls		Yes	Yes	Yes	Yes	Yes
Year dummy controls		Yes	Yes	Yes	Yes	Yes
Work history controls			Yes		Yes	Yes
Work trajectory controls						Yes
State-Ind %Emp Change * E	Yes	Yes	Yes	Yes	Yes	Yes
State-Ind %Emp Change * U	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient vector β or $\beta(q)$	β	β	β	$\beta(q)$	$\beta(q)$	$\beta(q)$

Notes: Sample is 285,741 persons who are employed or unemployed in CPS at $q = 0$ and for whom a PIK is available for linking to the LEHD. Number of observations in regression is 571,482. All control variables are deviations from means. Dependent variable is {0,1} employment indicator; mean = 0.7130.

All estimated δ parameters are statistically different from zero. Gray shading in the lower three panels indicates reported estimate is statistically significant at the 0.01 level. CPS, Current Population Survey; LEHD, Longitudinal Employer-Household Dynamics; PIK, Protected Identification Key.