Online Appendix for "Rising Between Firm Inequality and Declining Labor Market Fluidity: Evidence of a Changing Job Ladder" By John Haltiwanger and James Spletzer.

A. Percentiles of Earnings Distribution in the LEHD and CPS data

Characterizing the percentiles of the LEHD full quarter earnings distribution will enable us to analyze whether changes in the upper tail or lower tail, or both tails, of the earnings distribution are driving the increasing variance. These percentiles also allow for a comparison of the LEHD earnings distribution to published data from the Current Population Survey (CPS).

The top left panel of Figure A.2 shows the level of real LEHD full-quarter earnings associated with the first percentile, the fifth percentile, the tenth percentile, the median, the 90th percentile, the 95th percentile, and the 99th percentile.[1] With the scale of the vertical axis, it is difficult to distinguish the levels of the lower percentiles. Full-quarter real earnings are approximately $250 per quarter at the 1st percentile, $1100 per quarter at the 5th percentile, and $2100 per quarter at the 10th percentile. Median real full quarter earnings average approximately $9100 per quarter; median real full quarter earnings are procyclical with a noticeable upward trend from $8500 in the first quarter of 2010 to $9500 in the first quarter of 2018.

The graph in the top right panel of Figure A.2 shows the LEHD full-quarter earnings percentiles indexed to 100 in 1998. The first percentile of earnings has fallen by roughly six percent between 1998 and 2018, whereas the 5th, 10th, and 50th percentiles have risen by four to 10 percent. During the 1998 to 2018 time period, the 90th percentile has risen by 28 percent, the 95th percentile has risen by 35 percent, and the 99th percentile has risen by 46 percent. The LEHD full quarter earnings data is consistent with findings in the literature that much of the

[1] To be exact, in each year we estimated the percentiles from the log real earnings data and then converted these point estimates into levels of real earnings. Following standard Census Bureau disclosure avoidance methodology, the Xth percentile is computed as the mean LN earnings for all individuals who have LN earnings between the (X-½)th and the (X+½)th percentiles.

recent increase in earnings dispersion during the past several decades is at the upper end of the earnings distribution.

The LEHD full quarter earnings distribution is quite similar to the published statistics from the CPS. The BLS publishes the 10th, 50th, and 90th percentiles of usual weekly earnings of full time wage and salary workers.[2] Multiplying these data by 13 to create quarterly statistics, and converting to real, the CPS and the LEHD percentiles are given in the graph in the bottom left panel of Figure 1. The LEHD full-quarter earnings distribution is wider than the CPS full time wage and salary earnings distribution (the LEHD 10th is less than the CPS 10th and the LEHD 90th is greater than the CPS 90th), but otherwise the two distributions are reasonably close. Of special note is the increasing 90th percentile in both distributions.

This similarity between the LEHD full-quarter earnings distribution and the CPS full time wage and salary earnings distribution is also apparent in the bottom right panel of Figure A.2, which indexes all the series at 100 in 1998. Between 1998 and 2018, the 10th percentiles of the LEHD and the CPS earnings distribution rose by seven to eleven percent, the medians rose by nine to twelve percent, and the 90th percentiles exhibited the largest increases (23 to 28 percent).

B. Robustness of Variance Decomposition Results to Definition of the Firm

Table A.1 presents the variance decomposition when using the SEIN, the EIN, and the enterprise definition of the firm. The first column replicates the basic variance decomposition from Figure 1 and Table 1 of the main text, and the second and third columns present the decomposition for different years (1998-2016 rather than 1998-2018) and for a sample with nonmissing enterprise firm ID codes (the enterprise firm ID is missing in our 2017 and 2018 extracts of the LEHD data given that integration of the Longitudinal Business Database (LBD)

[2] These percentiles are available at http://www.bls.gov/webapps/legacy/cpswktab5.htm. The median is available for 1979 to the present. The 10th and 90th percentiles are available for years 2000 to the present, with earlier years available by request.

and LEHD data are not yet accomplished for those years, and is missing for a small percentage of observations in all other years). In the latter three columns that use a consistent sample, the percentage of total variance growth that is between 4-digit NAICS industries is 59.6 percent when using the SEIN, is 58.3 percent when using the EIN, and is 55.0 percent when using the enterprise firm ID. In this analysis, we have redefined industries at each level of firm aggregation, using maximum employment to define industries at higher levels of aggregation. For example, if an EIN contains two SEINs with different SEIN-level industries, the EIN-level industry is the industry of the SEIN with the higher employment. These results show that our finding that more than half of variance growth is between 4-digit NAICS industries is unaffected by the definition of the firm.

Not surprisingly, changing the definition of the firm affects the amount of variance growth that is within firms versus between firms. In the latter three columns of Table 2, we document that 94.0 percent of total variance growth is between firms when using the SEIN, 90.1 percent is between firms when using the EIN, and 74.8 percent is between firms when using the enterprise firm ID as the definition of the firm. We believe that these statistics help to reconcile the various statistics in the literature that estimate the amount of variance growth that is within firms versus between firms. Studies that use establishment-level data tend to find a large amount of variance growth between establishments, whereas studies that use enterprise-level data find a large yet somewhat smaller amount of variance growth between firms.

C. Comparisons of Our Fluidity Measures to Published QWI and J2J Series from LEHD

In Figure A.3, we provide comparisons of our measures with the published QWI and J2J series from LEHD.[3] For the published quarterly series we report only the Q1 series. Panel A shows alternative quarterly hires series from the QWI and J2J. The range of published series corresponds to a broad based hires measure (e.g, hires for QWI all matches that are new in the current quarter) to narrower definitions (e.g., hires for QWI that are transitions to a FQ position in the current quarter). Not surprisingly the levels of these alternatives differ and are substantially lower than the annual hires series into FQ positions that we use. In addition, definitional differences as well as the presence of job turnover implies that the annual measures are not simply interpreted as aggregates of the quarterly measures. However, the pairwise correlations between all of the alternatives in panel A including our annual series are all above 0.9. Relatedly, the long run decline in the alternative series is quite similar in terms of percent changes from 2001 to 2018. QWI all hires and FQ hires decline by 25% and 17% respectively. The annual hires series we construct declines by 16% from 2001 to 2018.

Panel B of Figure A.3 turns to decompositions of hires into hires from nonemployment and transitions between employers. The published J2J Job-to-Job Flow series reflects job-to-job transitions from one main job to another in the current quarter. The published J2J hires from nonemployment series reflects hires into new main jobs in the current quarter following at least a brief spell of nonemployment. Again the magnitudes of these quarterly series (for Q1) are lower than those of our annual series but the correlation between our annual series and the quarterly published series are very high (about 0.9 for J2J job-to-job flow series vs. the annual employer-to-employer series and also for the J2J hires from nonemployment vs. the annual hires from nonemployment series). The percent declines in the alternative series are similar. Published J2J

[3] We intentionally use the term employer-to-employer flows in this paper (and shorthand E2E) to avoid confusion with the published job-to-job flows (J2J) series from LEHD.

quarterly (Q1) job-to-job flows decline by 12% from 2001-18 while the annual employer-to-employer series we construct declines by 13% over this same period. Published quarterly (Q1) hires from non-employment decline by 21% from 2001-18 and the annual hires from nonemployment series declines by 18% over that same period.

Our takeaway from Figure A.3 is that our annual measures are capturing the well-known findings of a declining pace of hires with an especially large decline in hires from non-employment. In addition, we primarily exploit the between-industry variation in these measures in the analysis in the paper. Our measures of the share of employment accounted for by employer-to-employer transitions are conservative in that we require that the transitions are from one FQ job to another. Relatedly our measures of stayers are conservative based on requiring being at the same employer one year to the next in a FQ capacity.

*D. Illustrating a Changing Job Ladder – Patterns for Selected Industrie*s

We interpret the regression results and variance decompositions through the lens of a changing job ladder over time. To facilitate this interpretation, Figure A.4 illustrates the relationship between earnings changes for selected industries ranked by the share of hires from job switchers from different industries. Panel A of Figure A.4 shows selected industries in the bottom quintile of industries ranked in this fashion while Panel B shows selected industries in the top quintile. The share of hires from job switchers from different industries is twice as large (on average from 1998 and 2018) in the bottom panel compared to the top panel. Earnings are about 140 log points larger in the bottom panel on average in the top panel compared to the top panel. Moreover, the increase in earnings in the bottom panel from 1998 to 2018 is more than 25 log points greater than in the top panel.

Figure A.4 is consistent with a job ladder with the rungs of the ladder becoming further apart over time. Appropriate caution is required given we show only selected industries and without any controls. It is naïve to interpret Figure A.4 as suggesting that individuals get on the job ladder at the bottom in industries like restaurants and drinking places early in their career and climb the ladder to find themselves at software publishers later in their career. Still Figure A.4 highlights that the top industries in terms of shares of hires of job switchers from other industries are very high earnings industries and the earnings gap for such industries is growing. Moreover, Figure A.4 mimics the patterns in Tables 2 and 3 and Figure 5. The latter show much higher earnings in industries with a higher share of job switchers and that this earnings gap is rising over time. Tables 2 and 3 also shows that this pattern is robust to inclusion of firm and worker demographic controls. Not depicted but consistent with Figure A.4 is that the bottom panel industries have a high share of hires from nonemployment.

Table A.1: Variance Decomposition

Firm Definition:	SEIN	SEIN	SEIN	EIN	Enterprise
Years:	1998-2018	1998-2016	1998-2016	1998-2016	1998-2016
Sample:	Full Sample	Full Sample	Nonmiss Firm ID	Nonmiss Firm ID	Nonmiss Firm ID
Levels (Final Year)					
Variance LN($)	1.291	1.275	1.259	1.259	1.259
Within Firms	0.575	0.578	0.579	0.599	0.648
Between Firms	0.716	0.697	0.680	0.660	0.611
Within Industry	0.337	0.328	0.321	0.301	0.266
Between Industry	0.379	0.369	0.359	0.359	0.345
1998-Final Year Growth					
Variance LN($)	0.182	0.166	0.151	0.151	0.151
Within Firms	0.009	0.012	0.009	0.015	0.038
Between Firms	0.173	0.154	0.142	0.136	0.113
Within Industry	0.065	0.056	0.052	0.048	0.030
Between Industry	0.108	0.098	0.090	0.088	0.083
Levels (Final Year)					
Variance LN($)	100.0%	100.0%	100.0%	100.0%	100.0%
Within Firms	44.5%	45.3%	46.0%	47.6%	51.5%
Between Firms	55.5%	54.7%	54.0%	52.4%	48.5%
Within Industry	26.1%	25.7%	25.5%	23.9%	21.1%
Between Industry	29.4%	28.9%	28.5%	28.5%	27.4%
Between Firms	100.0%	100.0%	100.0%	100.0%	100.0%
Within Industry	47.1%	47.1%	47.2%	45.6%	43.5%
Between Industry	52.9%	52.9%	52.8%	54.4%	56.5%
1998-Final Year Growth					
Variance LN($)	100.0%	100.0%	100.0%	100.0%	100.0%
Within Firms	4.9%	7.2%	6.0%	9.9%	25.2%
Between Firms	95.1%	92.8%	94.0%	90.1%	74.8%
Within Industry	35.7%	33.7%	34.4%	31.8%	19.9%
Between Industry	59.3%	59.0%	59.6%	58.3%	55.0%
Between Firms	100.0%	100.0%	100.0%	100.0%	100.0%
Within Industry	37.6%	36.4%	36.6%	35.3%	26.5%
Between Industry	62.4%	63.6%	63.4%	64.7%	73.5%

Figure A.1: Descriptive Statistics

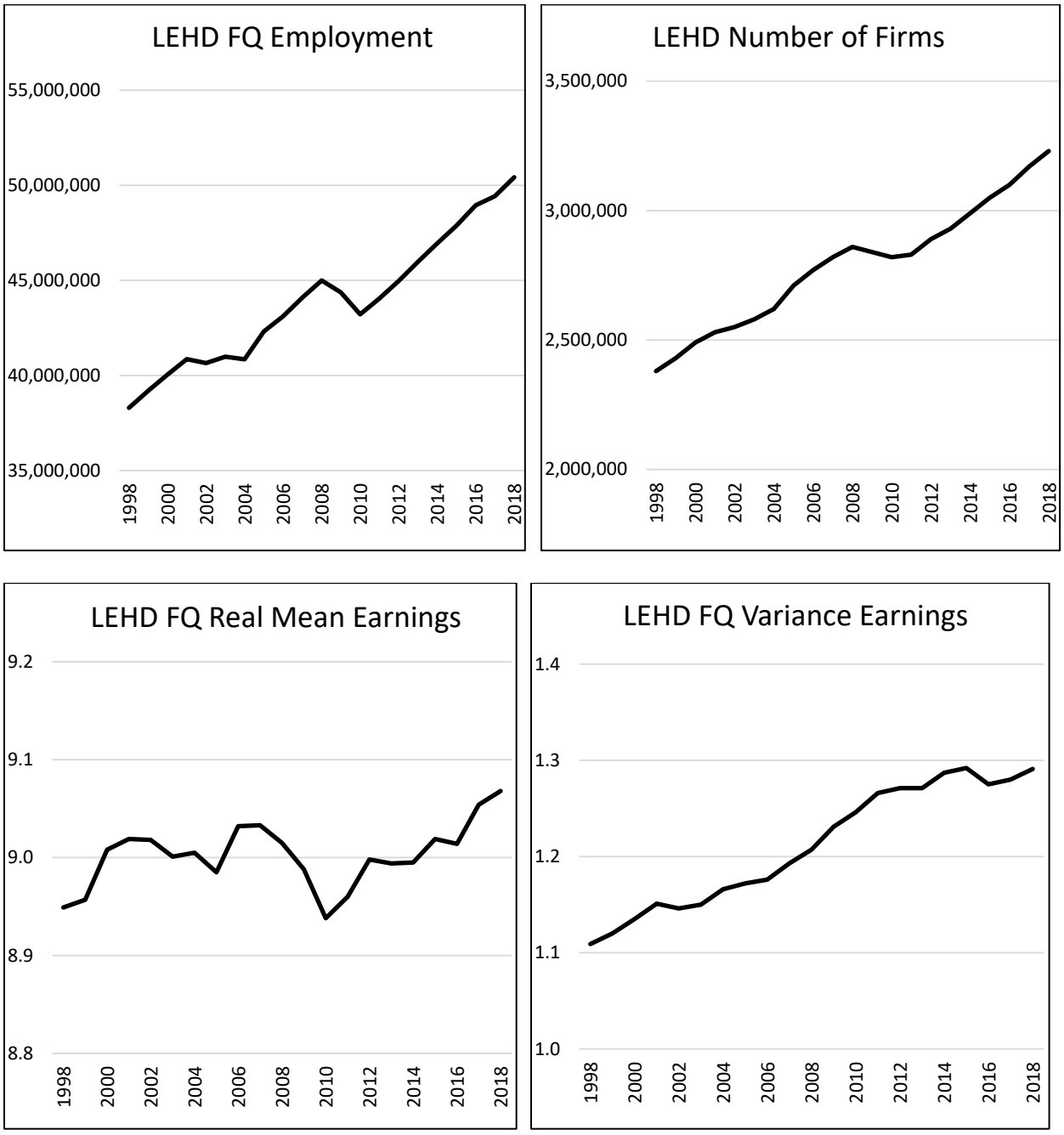
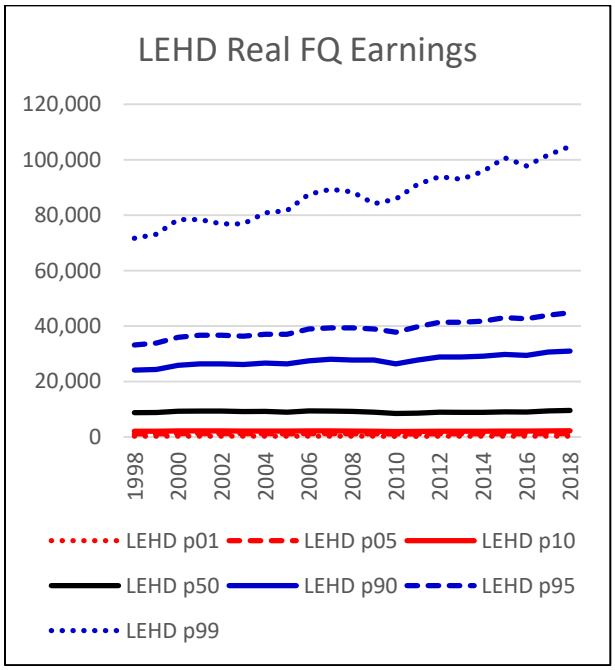
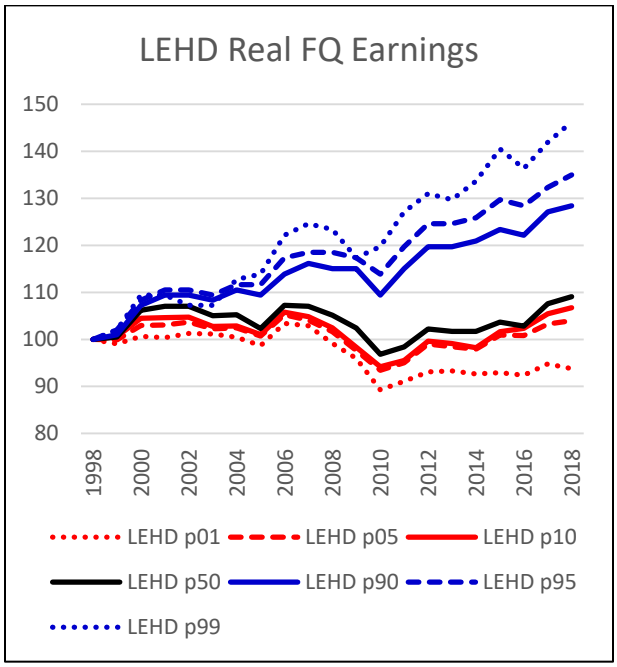
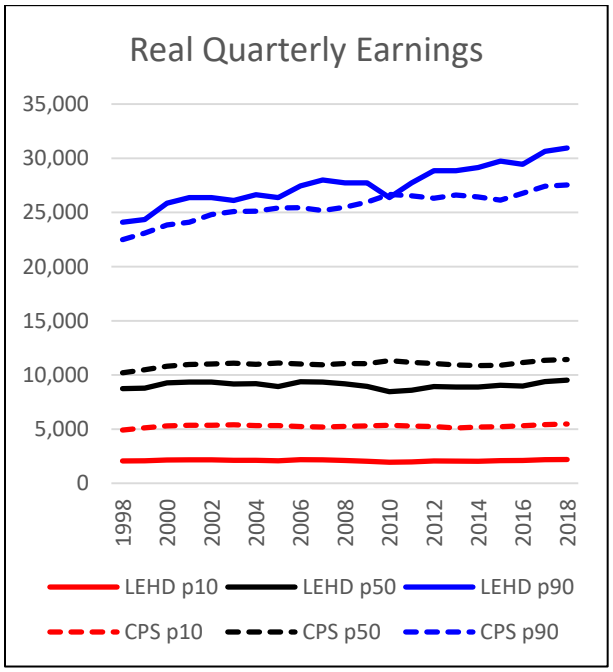


Figure A.2: Percentiles from the LEHD and CPS Earnings Distribution







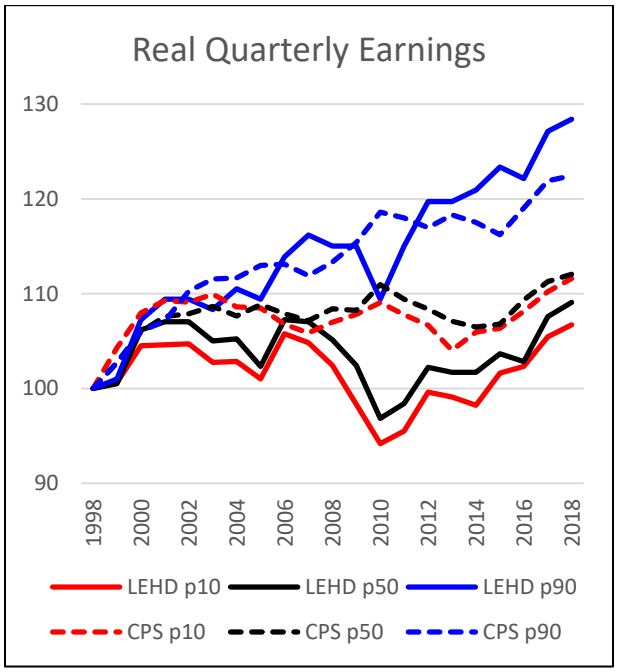
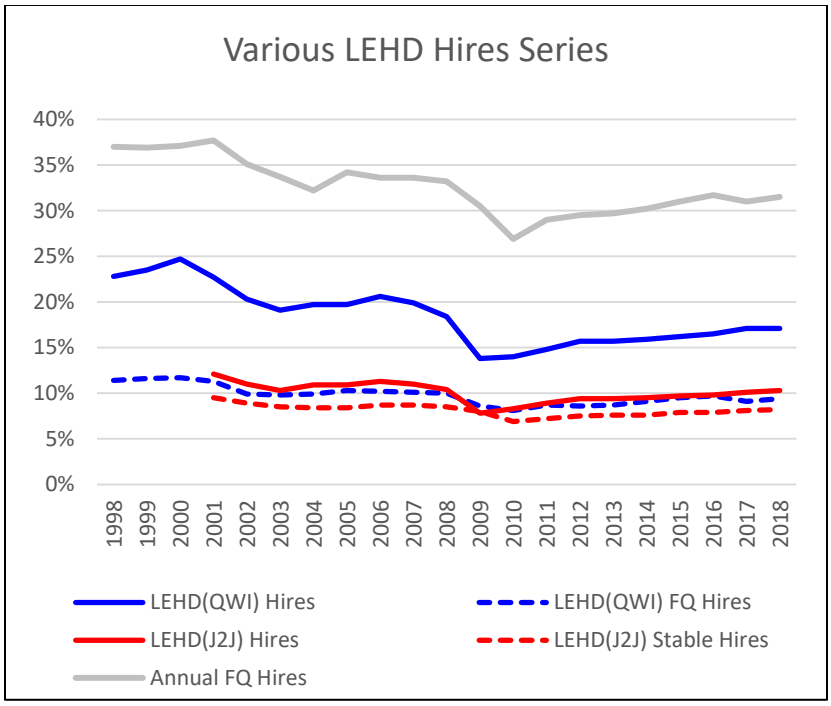


Figure A.3. Comparisons of Annual Fluidity Measures to Published QWI and J2J Quarterly Flows.

A. Annual FQ Hires vs. Published QWI and J2J Hires



B. Annual FQ Hires from Nonemployment and E2E vs. Published Quarterly J2J

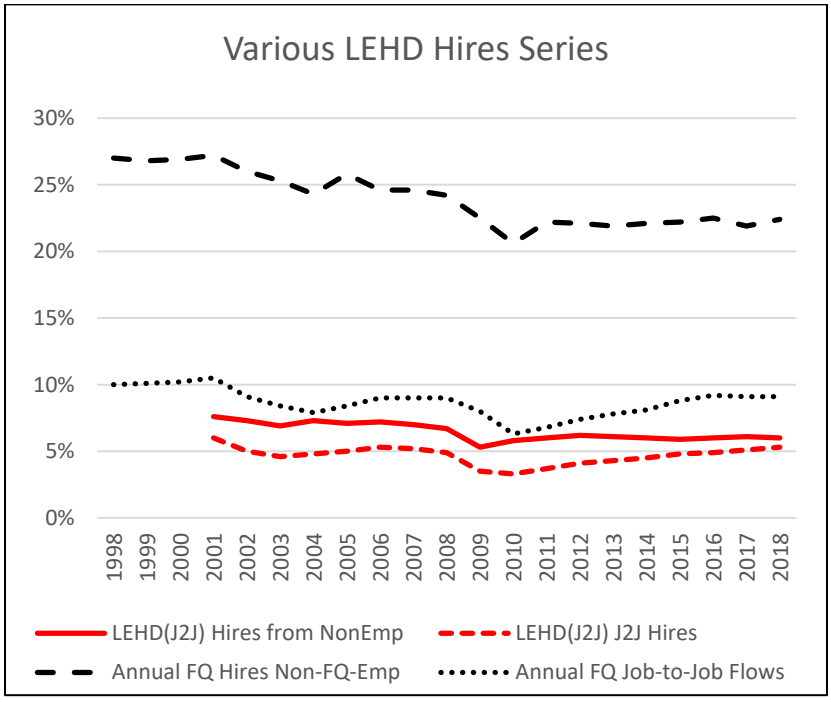
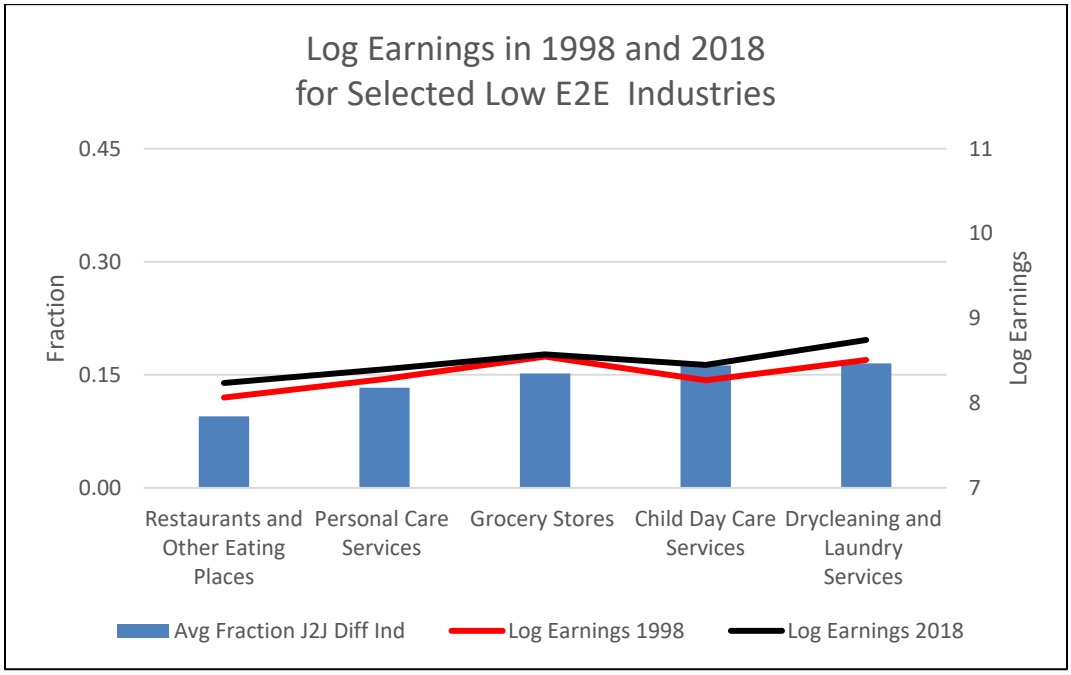


Figure A.4: Employer-to-employer Flows and Earnings for Selected Industries

A. Low E2E from Different Industries



B. High E2E from Different Industries