Reconsidering the Consequences of Worker Displacements: Survey versus Administrative Measurements

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Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Chicago, the Federal Reserve System, or the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.
Workers suffer persistent earnings losses

Strongly established using mass layoffs

But, even in mass layoffs, many reasons for separation
  - Retirement
  - Quit for different job
  - Other transitions (family care, schooling, etc)

Linked survey-administrative data
  - Worker reported reason for separation
  - Subsequent non-participation vs unemployed
Traditional Measurement of Displaced Workers
Traditional Measurement of Displaced Workers

sepation probability

← employer shrinks  0  employer grows →

overall separation rate
Traditional Measurement of Displaced Workers

- Employer shrinks
- "mass layoff"
- Overall separation rate
All Separations Are Influenced by Firm Conditions

- Mass layoff decreases separation probability.
- Employer shrinking leads to distress, quit, and other separations.
- Overall separation rate increases with employer growth.

[Diagram showing separation probability and overall separation rate with employer shrinkage leading to increased distress, quit, and other separations, and employer growth leading to an increase in the overall separation rate.]
Composition of separations

- Survey data: Reason for separation
- Administrative data: Firm growth at time of separation
Outline

- Datasets and data linking;
- Comparing indicators of displacement;
- Estimating earnings losses;
- Earnings histories with long stretches of zeros
Datasets

Survey of Income and Program Participation (SIPP):
- 2001 and 2004 panels;
- 4 month reference period.

Longitudinal Employer Household Dynamics (LEHD):
- Quarterly covered unemployment insurance (UI) earnings;
- Longitudinal employer and person linkages;
- Covers 90% or more of employers;
- All 50 States and through 2008.
Datasets

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- Quarterly covered unemployment insurance (UI) earnings;
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Design

- Link SIPP and LEHD
  - Link exists at person level
  - Challenge: linking jobs
- Defining separation: survey and administrative data agree
- SIPP contributes a worker report of reason for separation
- LEHD contributes:
  - earnings (separators and controls)
  - firm performance (growth rates)
## Survey reasons for separations

<table>
<thead>
<tr>
<th>Reason</th>
<th>Share</th>
<th>ML Share</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distress</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On layoff</td>
<td>0.14</td>
<td>0.23</td>
</tr>
<tr>
<td>Employer bankrupt/sold business</td>
<td>0.03</td>
<td>0.62</td>
</tr>
<tr>
<td>Slack work or business conditions</td>
<td>0.03</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Total Distress</strong></td>
<td>0.20</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>Quit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit to take another job</td>
<td>0.32</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit for some other reasons</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>Retirement or old age</td>
<td>0.11</td>
<td>0.04</td>
</tr>
<tr>
<td>Unsatisfactory work arrangement</td>
<td>0.08</td>
<td>0.04</td>
</tr>
<tr>
<td>Discharged/fired</td>
<td>0.07</td>
<td>0.06</td>
</tr>
<tr>
<td>Other family/personal obligation</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>Own illness/injury</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>School/training</td>
<td>0.01</td>
<td>0.09</td>
</tr>
<tr>
<td>Job was temporary and ended</td>
<td>0.01</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Total Other</strong></td>
<td>0.49</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Memo: Continuers</strong></td>
<td>N/A</td>
<td>0.02</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Reason</th>
<th>Share</th>
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</tr>
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<tbody>
<tr>
<td>Separations</td>
<td>6500</td>
<td>N/A</td>
</tr>
<tr>
<td>Continuers (Unique Persons)</td>
<td>205,600 (28,000)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Separation Probabilities: All Separations
Separation Probabilities: Survey Reason

![Graph showing separation probabilities for distress, other, and quit reasons. The graph plots separation probability against employer growth.]
Separation Probabilities: Survey Reason, Older Workers

The graph shows separation probabilities as a function of employer growth. The black line represents the probability of retirement, and the blue dotted line represents other reasons for separation. The y-axis represents the separation probability, ranging from 0 to 0.12, and the x-axis represents employer growth, ranging from -0.6 to 0.6.
Event study specification for earnings losses

\[ e_{ik}^y = \alpha_i^y + \gamma_t + \beta X_{ik}^y + \sum_{k=-3}^{16} \delta_k D_{ik}^y + \sum_{k=-3}^{16} \gamma_k E_{iy}^k + u_{ik}^y. \]

- \( e_{ik}^y \): earnings of person \( i \) normalized to mean of pre-displacement earnings in event time \( k \), when they were matched in SIPP-LEHD in calendar time \( y \);
- \( \alpha_i^y \): fixed effect for a record matched in SIPP-LEHD (person - “quarter matched”);
- \( \gamma_t \): calendar time dummy;
- \( X_{ik}^y \): a quartic in age;
- \( D_{ik}^y \): indicator for quarters relative to a displacement (or other class of separation);
- \( E_{ik}^y \): indicator for quarters relative to a continuer.
Earnings Loss Following Mass Layoff, By Survey Reason
Recovering latent outcome

ML: mass layoff

ML*: ML caused by employer contraction

not ML*: ML would have happened anyway

no growth: what happens anyway

employer shrinks → 0 → employer grows

distress

probability

← ML: mass layoff

← employer shrinks

→ employer grows
Recovering latent earnings losses

Conditioning separately on each of \( s \in \{ \text{distress, quit and other} \} \):
Recovering latent earnings losses

Conditioning separately on each of \( s \in \{\text{distress}, \text{quit and other}\} \):

\[
\mathbb{E}[\Delta\text{earn}|\text{ML}_s] = \pi_s \mathbb{E}[\Delta\text{earn}|\text{ML}^*_s] + (1 - \pi_s) \mathbb{E}[\Delta\text{earn}|\text{not ML}^*_s]
\]

\[\quad \pi_s = \text{Pr}(\text{ML}^*_s|\text{ML}_s)\]
Recovering latent earnings losses

Conditioning separately on each of \( s \in \{\text{distress, quit and other}\} \):

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\]

\( \pi_s = \Pr(\text{ML}^*_s|\text{ML}_s) \)

Identifying assumptions:

\( \mathbb{E}[\Delta \text{earn}|\text{not ML}^*_s] = \mathbb{E}[\Delta \text{earn}|\text{no growth}_s] \)

\( \Pr(\text{not ML}^*_s) = \Pr(\text{no growth}_s) \)
Recovering latent earnings losses

Conditioning separately on each of \( s \in \{\text{distress, quit and other}\} \):

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\( \Pr(\text{not ML}_s^*) = \Pr(\text{no growth}_s) \)

\[
\Rightarrow \pi_s = \frac{\Pr(\text{ML}_s) - \Pr(\text{no growth}_s)}{\Pr(\text{ML}_s)}
\]
Recovering latent earnings losses

Conditioning separately on each of $s \in \{\text{distress, quit and other}\}$:

$$E[\Delta \text{earn} | ML_s] = \pi_s E[\Delta \text{earn} | ML_s^*] + (1 - \pi_s) E[\Delta \text{earn} | \text{not } ML_s^*]$$

- $\pi_s = \Pr(ML_s^* | ML_s)$

Identifying assumptions:

- $E[\Delta \text{earn} | \text{not } ML_s^*] = E[\Delta \text{earn} | \text{no growth}_s]$
- $\Pr(\text{not } ML_s^*) = \Pr(\text{no growth}_s)$

$$\Rightarrow \pi_s = \frac{\Pr(ML_s) - \Pr(\text{no growth}_s)}{\Pr(ML_s)}$$

$$\underbrace{E[\Delta \text{earn} | ML_s^*]}_{\text{latent earnings losses}} = \frac{1}{\pi_s} E[\Delta \text{earn} | ML_s] - \frac{(1 - \pi_s)}{\pi_s} E[\Delta \text{earn} | \text{no growth}_s]$$
The Displacement Effect of Survey-Distress
The Displacement Effect of Survey-Quit
The Displacement Effect of Survey-Other
### Weighting up Survey Responses

<table>
<thead>
<tr>
<th>Survey reason (s)</th>
<th>Distress</th>
<th>Quit</th>
<th>Other</th>
</tr>
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<tbody>
<tr>
<td>Pr(Separation$_s$</td>
<td>ML)</td>
<td>0.055</td>
<td>0.021</td>
</tr>
<tr>
<td>Pr(Separation$_s$</td>
<td>No growth)</td>
<td>0.002</td>
<td>0.007</td>
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<tr>
<td>( \Pr(\text{Separation}_s \mid ML) )</td>
<td>0.055</td>
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<td>0.006</td>
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<tr>
<td>( \Pr(ML^*_s \mid ML_s) = \pi_s )</td>
<td>0.964</td>
<td>0.666</td>
<td>0.768</td>
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<tr>
<td>( \text{Share}_s \mid \text{ML} )</td>
<td>0.542</td>
<td>0.204</td>
<td>0.254</td>
</tr>
<tr>
<td>( \text{Share}_s \mid \text{ML}^* )</td>
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<td>0.159</td>
<td>0.229</td>
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$$\mathbb{E}[\Delta \text{earn} \mid \text{ML}^*] = \sum_s (\text{Share}_s \mid \text{ML}^*) \mathbb{E}[\Delta \text{earn} \mid \text{ML}_s^*]$$
The Total Displacement Effect

![Graph showing the total displacement effect with real earnings compared to quarters relative to displacement. The chart includes lines representing aggregated and latent data.]
Zeros Earnings Post-Separation

- Standard treatment: omit earnings with a calendar year of zeros
- Use survey to incorporate some zeros: people who reported looking for work in the year after the separation
Admin-Based ML Definition: Zeros
Incorporating “True” Zeros: Distress
Incorporating “True” Zeros: Quit
Incorporating “True” Zeros: Other
Incorporating “True” Zeros: Latent ML

![Graph showing real earnings with different scenarios]

- **no zeros**
- **some zeros**
- **all zeros**

Quarters relative to displacement along the x-axis, and real earnings with predisplacement = 1 along the y-axis.
Conclusion

- Survey and administrative measures not perfectly correlated
  - Quits and other survey-reported reasons occur in ML
  - Distress occurs in no growth
  - Older workers: Both retirement and other increase in ML
- Survey and administrative reports uncover heterogeneity in earnings losses
- Administrative indicator of ML gives a reasonable indicator of earnings losses
  - Distress does better in in ML than no growth
  - Quits do worse in ML than in no growth
- Including persistent unemployed increases estimates of earnings loss
## Match Quality: Person Quarter Counts

<table>
<thead>
<tr>
<th></th>
<th>SIPP Person Quarters</th>
<th>Positive LEHD Earnings</th>
<th>Matched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuers</td>
<td>525,900</td>
<td>499,800</td>
<td>348,100</td>
</tr>
<tr>
<td>Separate</td>
<td>22,700</td>
<td>22,000</td>
<td>10,100</td>
</tr>
</tbody>
</table>
Standard errors

\[ E[u_{ik}^yu_{i'k'}^y] \neq 0 \text{ if } i = i' \text{ or } k + y = k' + y' \ (k + y = t, \text{ calendar time}). \]

- Cluster two-ways: at person level, and calendar-time period [same issues and solution as Dube, Lester and Reich (2010)];
- Variance matrix:

\[ V^{IT} = V^I + V^T - V^{I\cap T} \]

set of individuals \( I \); set of calendar-time periods \( T \) [Cameron, Gelbach and Miller (2011)].
Additional sample restriction: remove zeros

- If a calendar year in the event window (−3 to +16) around a person-quarter has zero earnings in the LEHD then drop record.
Importance of (survey) non-distress separations in administrative mass layoffs

<table>
<thead>
<tr>
<th>Administrative indicator</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Reason</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distress</td>
<td>54%</td>
<td>18%</td>
</tr>
<tr>
<td>No Distress</td>
<td>46%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>