The Long-Run Cost of Job Loss as Measured by Consumption Changes

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Introduction

Motivation:

- Permanent job loss may be a significant loss of lifetime wealth
- Displaced workers bear a disproportionate cost of reallocation in a dynamic economy
- The costs of job loss continue to be of considerable interest to economists and policy makers
Introduction

Keys problems:

- How can we measure a long-run outcome?
- What is the appropriate counterfactual or benchmark?
- What control sample might allow us to estimate outcomes under the counterfactual?
Introduction

- **Our Solutions:**
  - A theoretical framework (but without fully specifying the environment)
  - Use consumption changes to capture changes in the marginal utility of wealth
  - A full insurance (against job loss) benchmark – gives an upper bound on what policy might achieve
  - Use temporary layoffs with known recall date to estimate approximate the counterfactual
Introduction

- Related to several literatures:
  - Test for full insurance and consumption smoothing (Cochrane, 1991; Dynarski and Gruber 1997; Stephens, 2001)
  - Short run effects of Unemployment on Consumption (Gruber, 1997; Browning and Crossley, 2001)
Outline

- Introduction
- Theoretical Framework
- Empirical Strategy
- Data:
  - The Canadian Out of Employment Panel
  - Sample and descriptive statistics
  - Expenditure questions and a first look at earnings and consumption changes
- Estimates
- Summary and Policy Implications
Theoretical Framework

- **Euler Equation**

\[ \lambda_{t+1} = \lambda_t + \varepsilon_{t+1}, \quad E_t(\varepsilon_{t+1}) = 0 \]

- **Shocks**

\[ \varepsilon_{t+1} = (1-d)\Gamma_t^0 + d\Gamma_t^1 + \eta_{t+1} \]

- Retained: \( d=1 \)
- Displaced: \( d=0 \)
- Other shocks

\[ \Gamma_t^0 > 0 > \Gamma_t^1 \]

Displaced: \( \mu_e \) rises
Theoretical Framework

Full insurance against job loss: \( \Gamma^0_t = \Gamma^1_t = 0 \)

\[
E_t(x_{t+1}) = \pi_t \left( \Gamma^1_t + E_t(\eta_{t+1} | d = 1) \right) + (1 - \pi_t) \left( \Gamma^0_t + E_t(\eta_{t+1} | d = 0) \right)
\]

\[
\pi_t \left( \Gamma^1_t + E_t(\eta_{t+1} | d = 1) \right) = -(1 - \pi_t) \left( \Gamma^0_t + E_t(\eta_{t+1} | d = 0) \right)
\]
Theoretical Framework

- Observables:
  - consumption

\[
\Delta \ln c_{t+1} = \Delta \phi_{t+1} - \Delta \lambda_{t+1}
\]

\[
E_t (\Delta \ln c_{t+1} | d = 0) = \Delta \phi_{t+1} - \Gamma^0_t - E_t (\eta_{t+1} | d = 0)
\]

\[
= \Delta \phi_{t+1} - \Gamma^0_t - \mu^0_t
\]

- covariates

\[
\Gamma^0_t = \gamma^0_t + \gamma' z_t
\]

Anticipated \hspace{2cm} \hspace{2cm} \hspace{2cm} Other shocks

Job loss
Theoretical Framework

- Object of interest: the average effect of displacement on the displaced (AETT)

\[
E^H \left[ E_t (\Delta \ln c_{t+1} \mid d = 0) \mid d = 0 \right]
\]

(11)

\[
= E^H [\Delta \phi_{t+1,h} \mid d = 0] - E^H [\Gamma_{t,h}^0 (z_{t,h}) \mid d = 0] - E^H [\mu_{t,h}^0 \mid d = 0]
\]

(12)

\[
= E^H [\Delta \phi_{t+1,h} \mid d = 0] - E^H [\gamma_{t,h}^0 \mid d = 0] - E^H [\gamma' z_{t,h} \mid d = 0] - E^H [\mu_{t,h}^0 \mid d = 0]
\]

(13)

- Problem: how to estimate

\[
E^H [\Delta \phi_{t+1,h} \mid d = 0] \text{ and } E^H [\mu_{t,h}^0 \mid d = 0]
\]

- Solution: matched controls
Empirical Strategy

- Problem: workers in continuing employment are not suitable controls because:

\[ E_t (\Delta \ln c_{t+1} \mid d = 1) = \Delta \phi_{t+1} + \Gamma^1_t - E_t (\mu^1_{t,h} \mid d = 1) \]

- (and because they have very different observables)

- Solution: temporary lay offs with known recall date are insured by their firm:

\[ \Gamma^0_t \approx \Gamma^1_t \approx 0 \]
Empirical Strategy

1. Use consumption growth to measure innovations in the *mue*
2. Among the "treatment" group of job losers, consumption growth confounds the effects of job loss with the effects of other shocks and anticipated changes in the *mue*
3. Construct a matched control group drawn from workers experiencing temporary layoff
4. Use this group to estimate consumption growth under the counterfactual of full insurance (common support, conditional independence of \( \mu_{t,h}^0 \) and \( \Delta \phi_{t+1,h} \))
5. The difference in consumption growth between the treatments and matched controls is an estimate of the cost of job loss among the job losers
Data

- Canadian Out of Employment Panel
  - Workers separating from jobs for any reason in 1993 and 1995
  - Multiple interviews; Final interview 5th quarter after separation
  - Wide variety of questions, including household consumption
  - We study the change in monthly household consumption from just prior to separation to the final interview
Data

- Sample
  - Aged 20-60
  - Self-reported layoffs and quit to take another job
  - Exclude:
    - living with parents or unrelated adults
    - Multiple jobs, at least one continuing
    - Reference job tenure < 6 months
  - Divide layoffs on the basis of ex ante expectation of recall
<table>
<thead>
<tr>
<th></th>
<th>Layoffs</th>
<th>Quits</th>
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<tr>
<td></td>
<td>No Expectation of Recall</td>
<td>Some Expectation of Recall</td>
</tr>
<tr>
<td>1st Interview Obs.</td>
<td>3023</td>
<td>1417</td>
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<tr>
<td>COEP 1995 (%)</td>
<td>845 (28%)</td>
<td>1122 (79%)</td>
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<td>Last Interview Obs. (%)</td>
<td>2199 (73%)</td>
<td>1127 (80%)</td>
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Demographics

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<tr>
<th>Demographic</th>
<th>Layoffs</th>
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<td>Some Expectation of Recall</td>
<td>Strong Expectation of Recall</td>
<td>No Expectation of Recall</td>
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<tr>
<td>highschool</td>
<td>0.37</td>
<td>0.42</td>
<td>0.44</td>
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<td>college</td>
<td>0.33</td>
<td>0.21</td>
<td>0.27</td>
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<td>age</td>
<td>38.0</td>
<td>37.8</td>
<td>39.0</td>
<td>32.7</td>
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<td>ln (household size)</td>
<td>0.94</td>
<td>0.95</td>
<td>1.03</td>
<td>0.89</td>
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<td>male</td>
<td>0.53</td>
<td>0.61</td>
<td>0.48</td>
<td>0.60</td>
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<td>Reference Separation Job</td>
<td>Layoffs</td>
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<tr>
<td></td>
<td>No Expectation of Recall</td>
<td>Some Expectation of Recall</td>
<td>Strong Expectation of Recall</td>
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<td>manager</td>
<td>0.28</td>
<td>0.18</td>
<td>0.28</td>
<td>0.30</td>
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<tr>
<td>blue collar</td>
<td>0.33</td>
<td>0.61</td>
<td>0.46</td>
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<tr>
<td>union</td>
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<td>0.42</td>
<td>0.47</td>
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<td>seasonal</td>
<td>0.10</td>
<td>0.28</td>
<td>0.33</td>
<td>0^</td>
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<td>expected loss</td>
<td>0.45</td>
<td>0.71</td>
<td>0.81</td>
<td>1^</td>
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<td>Job Tenure (Months)</td>
<td>65.2</td>
<td>80.4</td>
<td>89.7</td>
<td>44.5</td>
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<td>Monthly Earnings</td>
<td>1.89</td>
<td>1.76</td>
<td>1.65</td>
<td>1.76</td>
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<td>Program Use</td>
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<td>UI in at least 1 of past 2 years</td>
<td>0.55</td>
<td>0.80</td>
<td>0.74</td>
<td>0.40</td>
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Expenditure Questions:

About how much did you and your household spend on everything in the past month? Please think about all bills such as rent, mortgage loan payments, utility and other bills, as well as all expenses such as food, clothing, transportation, entertainment and any other expenses you and your household may have.

Has the amount you spend on everything decreased since <ROE>? By what amount monthly?

Has the amount you spend on everything increased since <ROE>? By what amount monthly?

Lots of evidence that these collect valid and useful information
Figure 1: Proportional Income and Expenditure Changes

Proportional change in monthly amounts

Quit To Take Another Job
Layoff, Strong Expectation Of Recall
Layoff, Some Expectation Of Recall
Layoff, No Expectation of Recall

earnings expenditures

75th median
25th
<table>
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<tr>
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<td></td>
<td>No</td>
<td>Some</td>
<td>Strong</td>
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<td>Expectation of Recall</td>
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<td>Earnings</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>0.40</td>
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<td></td>
<td>q2</td>
<td>-0.47</td>
<td>-0.19</td>
<td>0</td>
<td>0.09</td>
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<td>q3</td>
<td>0.016</td>
<td>0.025</td>
<td>0.025</td>
<td>0.04</td>
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<td></td>
<td>mean</td>
<td>-0.44</td>
<td>-0.39</td>
<td>-0.31</td>
<td>-0.013</td>
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<td>Difference of mean from no expectation group, [t-stat]</td>
<td>0.044</td>
<td>0.13</td>
<td>0.42</td>
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<td></td>
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<tr>
<td>Kruskal-Wallis rank test of common distribution with no expectation group: $\chi^2_{(1)}$ (p-value)</td>
<td>8.6</td>
<td>36.5</td>
<td>109.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Expenditure</td>
<td>q1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>q2</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>q3</td>
<td>0.051</td>
<td>0.044</td>
<td>0.063</td>
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<tr>
<td></td>
<td>mean</td>
<td>0.0339</td>
<td>0.005</td>
<td>0.023</td>
<td>0.067</td>
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<td>Difference of mean from no expectation group, [t-stat]</td>
<td>0.038</td>
<td>0.056</td>
<td>0.099</td>
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<td>Kruskal-Wallis rank test of common distribution with no expectation group: $\chi^2_{(1)}$ (p-value)</td>
<td>11.6</td>
<td>30.0</td>
<td>39.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Estimates

- Propensity Scores estimated with a Probit (Table 2)

- Conditioning on:
  - a quadratic in age, gender, education dummies and the logarithm of household size
  - dummies for marital status and spousal employment status
  - dummies indicating capital income and home ownership
  - occupation dummies, a union dummy and job tenure dummies;
  - a dummy for unemployment insurance use in the previous two years
  - a polynomial in earnings in the reference job
  - the local unemployment rate
  - region and time dummies.
Figure 3: Distributions of Propensity Scores for Permanent Layoff
Estimates

- Propensity Score Matching
  - Common support imposed
  - Balancing tests
  - Locally Linear Regression, matching on propensity score
  - Results robust to: more trimming, bandwidth, matching on index, nearest neighbor matching

- Inference
  - 999 bootstrap replications
<table>
<thead>
<tr>
<th>Sample Sizes</th>
<th>Mean Consumption Growth (%)</th>
<th>Difference [95% C.I.]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treated (Treated)</td>
<td>(Controls)</td>
</tr>
<tr>
<td>Unmatched Comparison</td>
<td>1461</td>
<td>-3.1</td>
</tr>
<tr>
<td>Matched Controls, Common Support</td>
<td>1449</td>
<td>-3.0</td>
</tr>
<tr>
<td>TABLE 3b: The Effect of Permanent Job Loss on Consumption Growth - Subsamples (Matched Controls, Common Support)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Mean Consumption Growth (%)</td>
</tr>
<tr>
<td></td>
<td>Treated</td>
<td>Permanent Layoffs (Treated)</td>
</tr>
<tr>
<td>Unionized</td>
<td>386</td>
<td>-2.6</td>
</tr>
<tr>
<td></td>
<td>305</td>
<td></td>
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<tr>
<td>Age &gt; 40 years</td>
<td>579</td>
<td>-6.4</td>
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<tr>
<td></td>
<td>264</td>
<td></td>
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<tr>
<td>Job Tenure</td>
<td>218</td>
<td>-7.4</td>
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<tr>
<td>&gt; 10 years</td>
<td>172</td>
<td></td>
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<tr>
<td>Women</td>
<td>701</td>
<td>-2.6</td>
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<td></td>
<td>347</td>
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<td>TABLE 3c: The Effect of Permanent Job Loss on Consumption Growth – Subsamples II (Matched Controls, Common Support)</td>
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<tr>
<td></td>
<td>Sample Size</td>
<td>Mean Consumption Growth (%)</td>
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<td></td>
<td>Treated Controls</td>
<td>Permanent Layoffs (Treated)</td>
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<td>Advanced Notice</td>
<td>503</td>
<td>1.6</td>
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<tr>
<td>&lt; 6 weeks (incl. 0)</td>
<td>392</td>
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<td>Expected Job Loss</td>
<td>599</td>
<td>-2.4</td>
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<tr>
<td>&lt; 6 weeks (incl. 0)</td>
<td>293</td>
<td></td>
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<td>Employed at Last Interview</td>
<td>780</td>
<td>-0.5</td>
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<tr>
<td></td>
<td>399</td>
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<tr>
<td>Method Description</td>
<td>Sample Size</td>
<td>Mean Consumption Growth (%)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Halved the bandwidth in local linear regression used in matching</strong></td>
<td>1449/657</td>
<td>-3.0</td>
</tr>
<tr>
<td><strong>Doubled the bandwidth</strong></td>
<td>1449/657</td>
<td>-3.0</td>
</tr>
<tr>
<td><strong>Deleted the 5% of treatments whose propensity scores corresponded to the lowest estimated densities among controls</strong></td>
<td>1388/657</td>
<td>-2.9</td>
</tr>
<tr>
<td><strong>Matched in the index rather than the predicted probability</strong></td>
<td>1449/657</td>
<td>-3.0</td>
</tr>
<tr>
<td><strong>Used a single nearest neighbour match rather than locally linear regression</strong></td>
<td>1449/657</td>
<td>-3.0</td>
</tr>
<tr>
<td><strong>More parsimonious specification of the propensity score model</strong></td>
<td>1688/723</td>
<td>-3.5</td>
</tr>
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</table>
Summary and Policy Implications

- Displaced Workers bear a disproportionate share of the costs of economic adjustment; it is important to measure their losses.
- Consumption data and a theoretical framework allow us to measure a long-run outcome from a short panel.
- It is important to define the counterfactual and tailor the estimation strategy to that counterfactual.
Summary and Policy Implications

- Permanently displaced workers experience a consumption loss of 4-10% relative to a full insurance benchmark (point estimate: 6.4%)

- The losses of older and high tenure workers may be larger (point estimates around 10%)
Summary and Policy Implications

The approach in this paper

- Delivers an upper bound on the benefit of any new cost mitigating policy in the current economic environment.
- Without fully specifying the environment

However...

- Not informative about the consequences of removing current provisions
- Need a full structural model to evaluate particular policy proposals