National Quarterly Workforce Indicators

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## Availability of various statistics

<table>
<thead>
<tr>
<th></th>
<th>QWI</th>
<th>QCEW</th>
<th>BED</th>
<th>JOLTS</th>
<th>CPS</th>
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</tr>
<tr>
<td>NAICS Sector</td>
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<td>Yes</td>
<td>Yes*</td>
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<td>Yes</td>
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<td>NAICS3</td>
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<td>Yes</td>
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<td>Age</td>
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<td></td>
<td></td>
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<td>Gender</td>
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<td></td>
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</table>
Motivation

- QWI a unique source integrating many of the different measures that are of interest in labor market analysis, from the *same source* data.
- Example: Gross work and job flows are difficult to measure on a consistent basis without fully integrated micro-data at the job (employer-employee link) level.
- Gross flows are very heterogeneous even within very detailed industry, geography, establishment size, ... or demographic group.
THE PROBLEM
QWI Coverage of the Private Workforce

- Period A
- Period B
- Proportion of QCEW universe in QWI
State availability in QWI+ MA
National QWI

  - Based on public-use data only
  - Aggregation algorithm published
- Integration into LEHD led by Lars Vilhuber and Camille Norwood
The solution

- Use data patterns from similar states to fill in the blanks (suppressed values, missing time-series)
- Use QCEW employment by industry as a benchmark
- Then aggregate up to national level
- This is an impute: we do it “right” = 200 times (or more)
- Measures of uncertainty available (see technical paper for details)
SOME PRELIMINARY RESULTS
Different measures available

- Graph_car
- Graph_car_ar
- Graph_car_ar_far
AVAILABILITY
Research version

- Downloadable right now from Cornell site
  - Rates only (no levels)
  - Non-standard naming convention
  - Only select cross-tabulations
  - Quality metrics ("total variation", etc.)
- Newer research versions will be made available over the course of the next 6-9 months
  - Levels
  - More cross-tabulations
  - Underlying state-level imputes
    - longer time-series for research for all states!
Prototype National QWI

The Quarterly Workforce Indicators are local labor market data produced and released every quarter by the United States Census Bureau. Unlike any other local labor market series produced in the U.S. or the rest of the world, the QWI measure employment flows for workers (accession and separations), jobs (creations and destructions) and earnings for demographic subgroups (age and sex), economic industry (NAICS industry groups), and detailed geography (county, Core-Based Statistical Area, and Workforce Investment Area, as well as experimental, unreleased block-level estimates). The current QWI data cover 47 states and about 98% of the private workforce in each of those states.

John Abowd and Lars Vilhuber have used the existing public-use data (and only those public-use data) to construct the first national estimates. The national estimates are an important enhancement to existing series because they include demographic and industry detail for both worker and job flows compiled from data that have been integrated at the micro-level by the Longitudinal Employer-Household Dynamics Program at the Census Bureau. The research paper (see below) compares the new estimates to national data published by the BLS from the Quarterly Census of Employment and Wages and the Business Employment Dynamics series. The paper and its underlying data can be downloaded from below.

Paper


- Paper in PDF format (color graphs)
- View paper with Google Docs


Data

The most current data can be downloaded from http://www.census.gov/quicktags/ national.
Official LEHD version

- Conforming to QWI V4.x data schema
  - All current QWI variables, identical names
  - Conforming file naming conventions
  - Accessible through QWI Explorer

- Schedule
  - Beta releases (feature incomplete) in Fall 2014
  - Release candidate (feature complete for NAICS Sectors) at the end of R2015Q1 production cycle
  - Regular version from R2015Q2 onwards for NAICS Sectors tabulations
Release schedule

- Beta: development version for early comments
- Release candidate: expected to conform to format and quality standards
- Regular version: conforms to format and quality standards
## Cross-tabulations

<table>
<thead>
<tr>
<th>Industry</th>
<th>Demographics</th>
<th>Firm age/size</th>
<th>Ownership</th>
<th>Earliest beta Release</th>
<th>Planned official production release</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAICS Sector</td>
<td>SA</td>
<td>F</td>
<td>P</td>
<td>Fall 2014</td>
<td>R2015Q2</td>
</tr>
<tr>
<td>NAICS Sector</td>
<td>SE, RH</td>
<td>F</td>
<td>P</td>
<td>Fall 2014</td>
<td>R2015Q2</td>
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<tr>
<td>NAICS Sector</td>
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<td>FA, FS</td>
<td>P</td>
<td>2014Q4</td>
<td>R2015Q3</td>
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<td>NAICS (3-digit)</td>
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<td>P</td>
<td>2015Q1</td>
<td>R2015Q4</td>
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<tr>
<td>NAICS (3-digit)</td>
<td>SA, SE, RH</td>
<td>FA, FS</td>
<td>P</td>
<td>2015Q2</td>
<td>R2015Q4</td>
</tr>
</tbody>
</table>
Ongoing LEHD work

- Quality metrics (total variation, missingness ratio)
  - Will become available
  - Data schema currently being developed

- Coding and statistical assessment for
  - Expansion to firm age and size cross-tabulations
  - Expansion to NAICS3, NAICS4
    - Depends on the “small-cell” edits working – far more suppressed cells
  - Use of more precise (confidential) tabulations
Thank you

Questions: Lars Vilhuber
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http://goo.gl/96UCw
Acknowledgements

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- No confidential data were used to prepare these data.

- The opinions expressed in this presentation are those of the authors and not the National Science Foundation nor the Census Bureau.
Worker Reallocation Rate

\[ WRR_{agskt} = \frac{A_{agskt} + S_{agskt}}{(B_{agskt} + E_{agskt})/2} \]

- This rate is available in the QWI for 8 age groups, both genders, NAICS sector, state (more detail is available than we used)
**Job Reallocation Rate**

\[
JRR_{agskt} = \frac{JC_{agskt} + JD_{agskt}}{(B_{agskt} + E_{agskt})/2}
\]

- This rate is available in the QWI for 8 age groups, both genders, NAICS sector, state (more detail is available than we used)
Excess Reallocation Rate

- \[ ERR = WRR - JRR \]
- The excess reallocation rate measures the extent to which gross worker flows exceed the minimum required to service the gross job flows
- This has been very difficult to estimate nationally because there were no data collected on a consistent basis for all the component flows
- QWI solved that problem
Statistical Methodology

- Divide the analysis into two periods
  - 1993:Q1-2001:Q4 (early period, many states are completely missing, 10 states complete)
  - 1999:Q1-(latest available) (later period, 37 states are complete)
- For each sub-period use a multiple imputation model to complete the missing data
- For the overlap period, use a ramped weight to compute the average implicate combining the two periods
- Use the standard multiple imputation formulae to combine implicates
National Estimates

\[
WRR_{agt} = \frac{A_{agt} + S_{agt}}{(B_{agt} + E_{agt})/2}
\]

= \frac{2}{B_{agt} + E_{agt}} \left[ \sum_{k,s} \left( \frac{B_{agkst} + E_{agkst}}{2} \right) WRR_{agkst} \right]

- The combining formula for producing the national WRR is shown above (similar formulae apply to other rates)
Implicate Combining Formulae I

\[
\overline{\text{WRR}}_{agkt} = \frac{1}{M} \sum_{\ell=1}^{M} \left[ \sum_{s} \frac{\left( B_{agskt}^{(\ell)} + E_{agskt}^{(\ell)} \right)}{2} \right] W_{agskt}^{(\ell)}
\]

\[
\hat{\text{WRR}}_{agkt}^{(\ell)} = \sum_{s} \frac{\left( B_{agskt}^{(\ell)} + E_{agskt}^{(\ell)} \right)}{2} \frac{W_{agskt}^{(\ell)}}{\sum_{\forall \nu} \frac{B_{ag\nu kt}^{(\ell)} + E_{ag\nu kt}^{(\ell)}}{2}}
\]
Implicate Combining Formulae II

\[ V^{(\ell)}[\widehat{WRR}_{agkt}] = \frac{1}{49} \sum_{s} \left( \frac{B^{(\ell)}_{agskt} + E^{(\ell)}_{agskt}}{2} \right) \left( WRR^{(\ell)}_{agskt} - \widehat{WRR}^{(\ell)}_{agkt} \right)^2 \]

\[ B\left[\overline{WRR}_{agkt}\right] = \frac{1}{M - 1} \sum_{\ell=1}^{M} \left( \widehat{WRR}^{(\ell)}_{agkt} - \overline{WRR}^{(\ell)}_{agkt} \right)^2 \]

\[ T\left[\overline{WRR}_{agkt}\right] = \frac{1}{M} \sum_{\ell=1}^{M} V^{(\ell)}[\widehat{WRR}_{agkt}] + \frac{M + 1}{M} B\left[\overline{WRR}_{agkt}\right] \]
Implicate Combining Formulae III

$$MR\left[\frac{WRR}{agkt}\right] = \frac{B\left[\frac{WRR}{agkt}\right]}{T\left[\frac{WRR}{agkt}\right]}$$
Research Background

- Gross job flows:
  - Dunne, Roberts and Samuelson (1989)
  - Davis and Haltiwanger (1990, 1992)
  - Davis, Haltiwanger and Schuh (1996)
  - BLS Business Employment Dynamics (Spletzer et al. 2004)

- Gross worker flows:
  - Abowd and Zellner (1985)
  - Poterba and Summers (1986)
  - Anderson and Meyer (1994)
  - BLS Job Openings and Labor Turnover Survey (Boon et al. 2008)

- Integrated flows (Worker, Job, Excess/Churning)
  - Abowd, Corbel and Kramarz (1999)
  - Burgess, Lane and Stevens (2000, 2001)
  - BLS JOLTS + BED (Davis, Faberman and Haltiwanger 2006; Boon et al. 2008; Davis, Faberman, Haltiwanger, and Rucker 2010)