National Quarterly Workforce Indicators

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United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Availability of various statistics

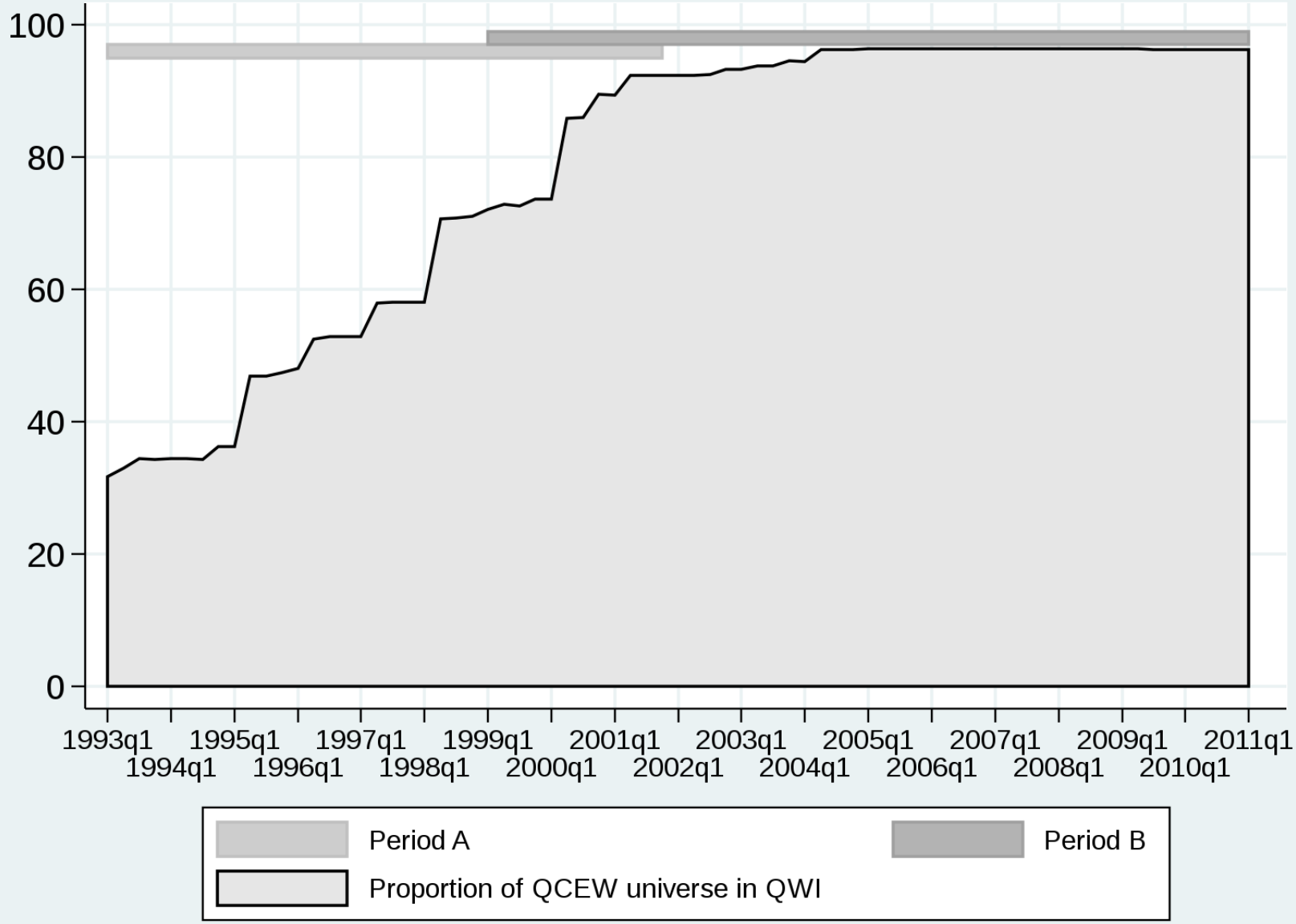
	QWI	QCEW	BED	JOLTS	CPS
National		Yes	Yes	Yes	Yes
State	Yes	Yes	Yes		
County	Yes	Yes			
NAICS Sector	Yes	Yes	Yes*	Yes	Yes
NAICS3	Yes	Yes			
Age	Yes				Yes
Gender	Yes				Yes
Race/Ethn.	Yes				Yes
Education	Yes				Yes

Motivation

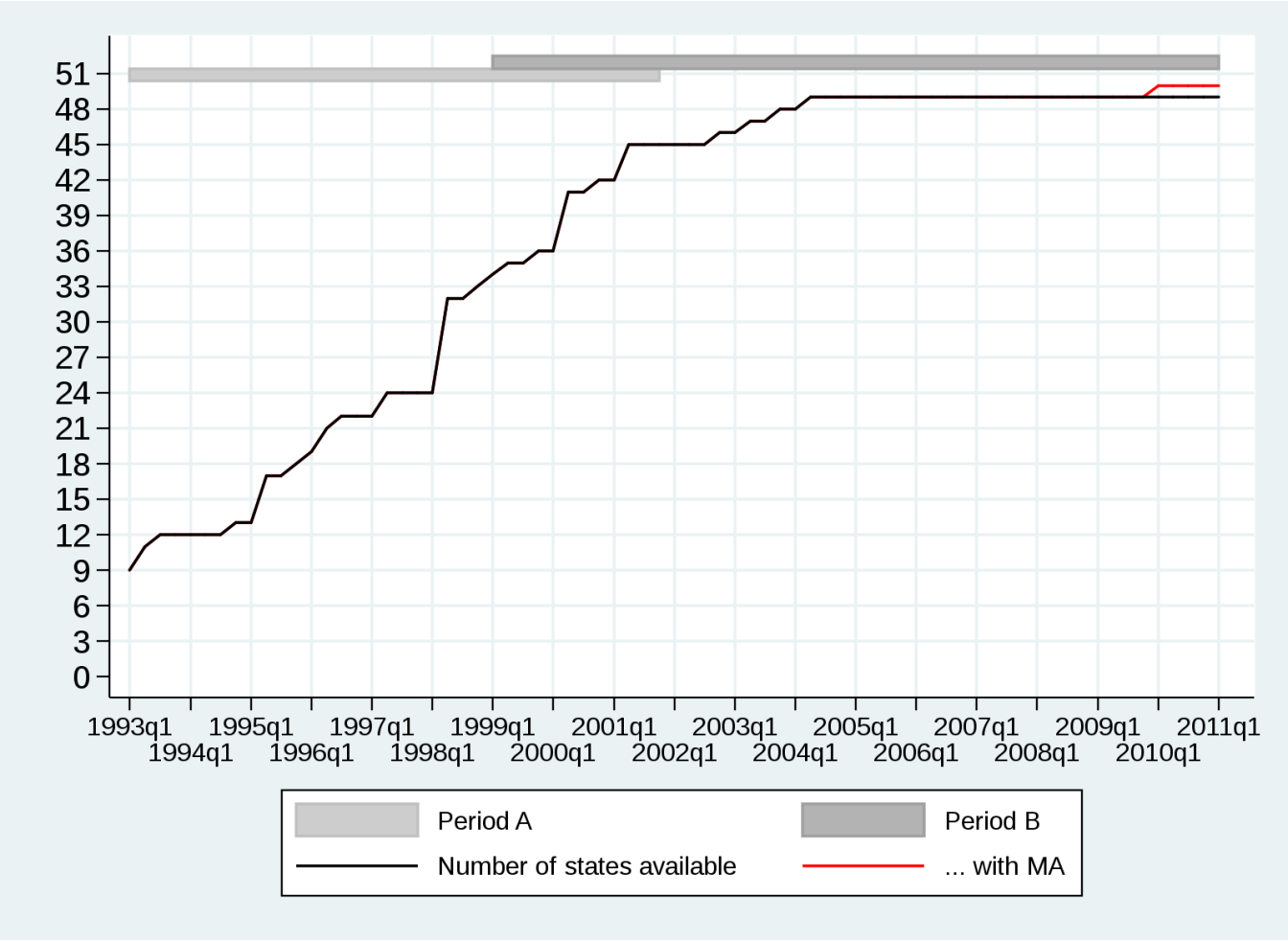
- QWI a unique source integrating many of the different measures that are of interest in labor market analysis, from the *same source* data
- Example: Gross work and job flows are difficult to measure on a consistent basis without fully integrated micro-data at the job (employer-employee link) level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

THE PROBLEM

QWI Coverage of the Private Workforce



State availability in QWI+ MA



National QWI

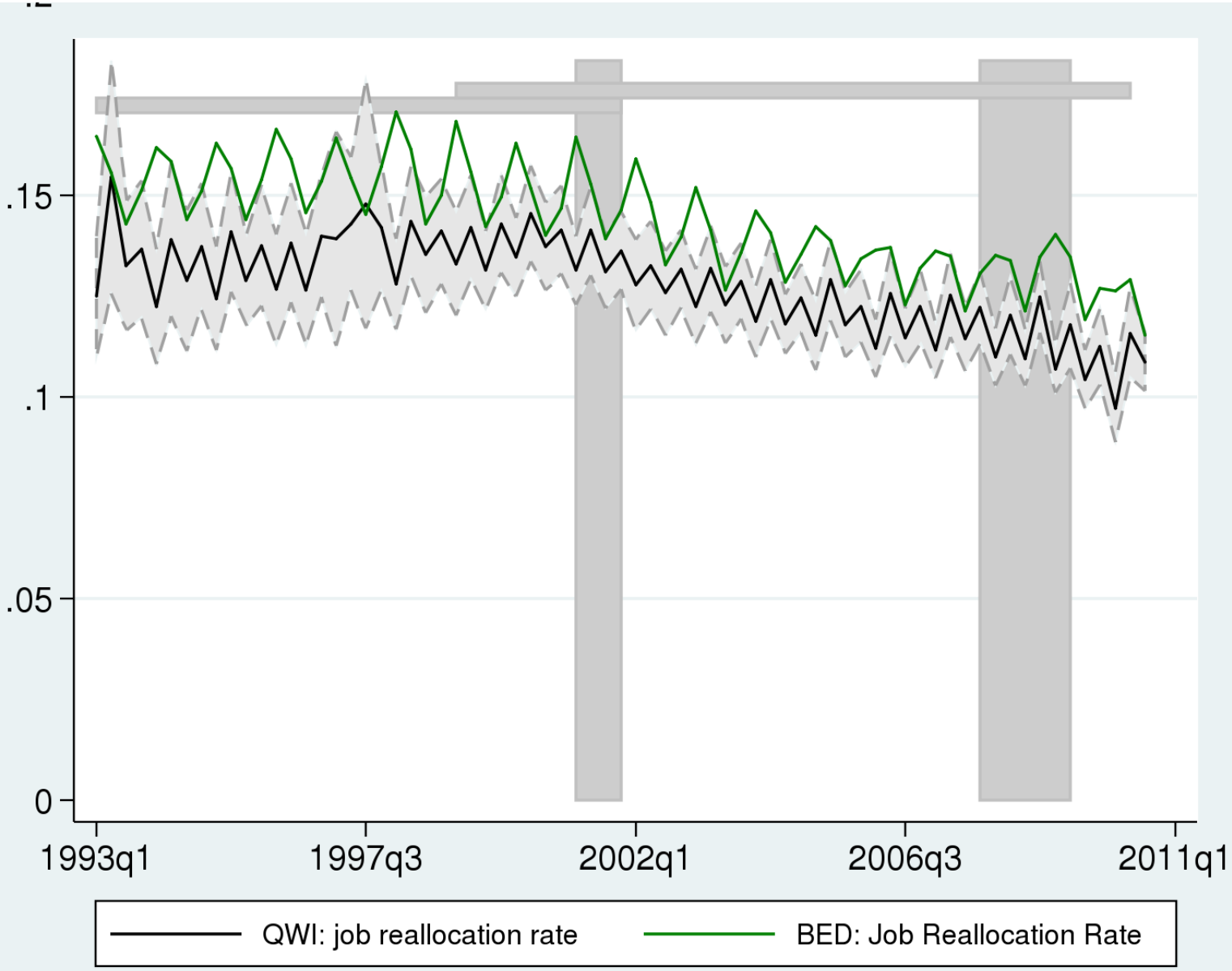
- Initially developed at Cornell University (Abowd and Vilhuber, 2011: *Journal of Econometrics*, Elsevier, vol. 161(1), pages 82-99, March; also CES WP-10-11)
  - Based on public-use data only
  - Aggregation algorithm published
- Integration into LEHD led by Lars Vilhuber and Camille Norwood

The solution

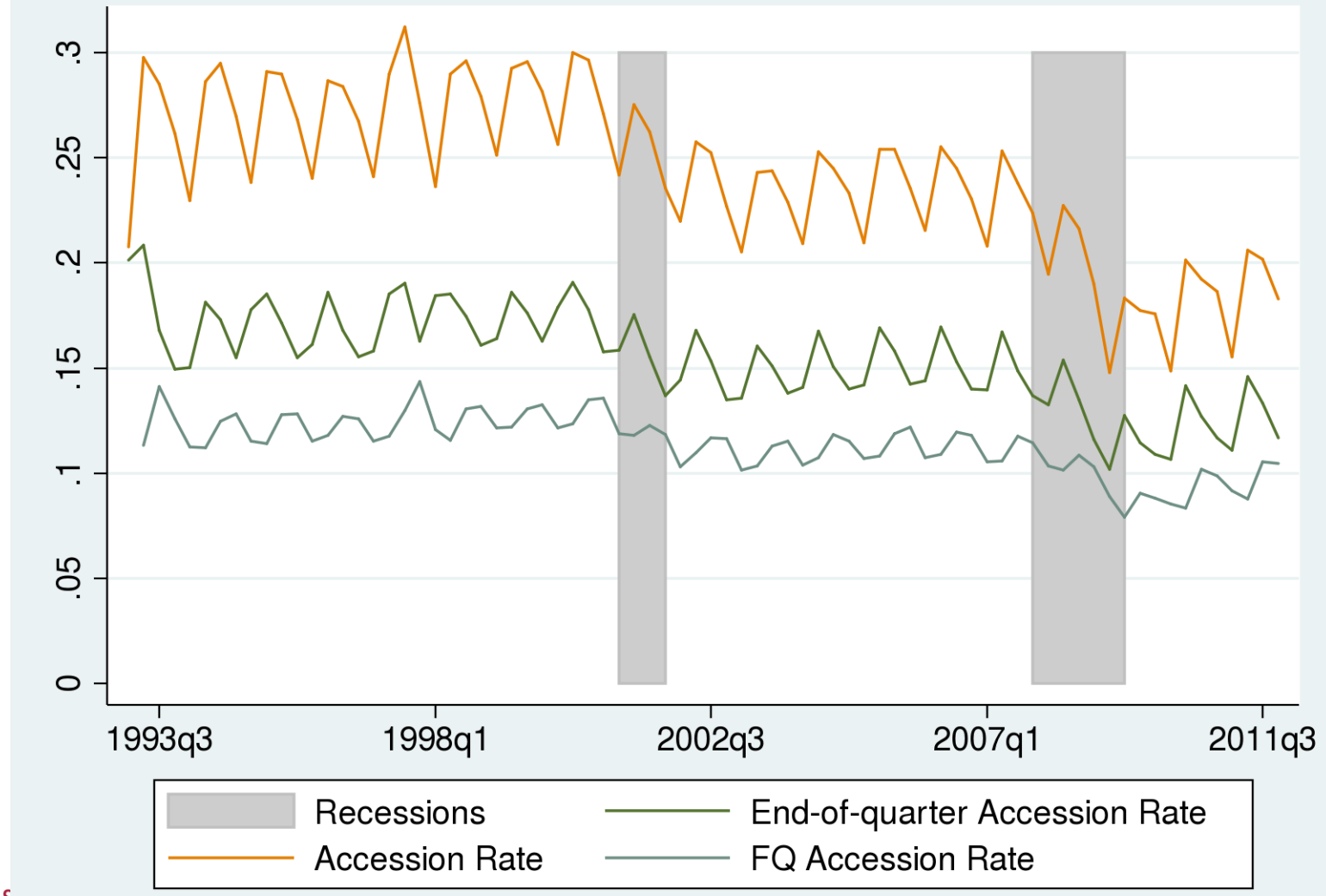
- Use data patterns from similar states to fill in the blanks (suppressed values, missing time-series)
- Use QCEW employment by industry as a benchmark
- Then aggregate up to national level
- This is an impute: we do it “right” = 200 times (or more)
- Measures of uncertainty available
  (see technical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

SOME PRELIMINARY RESULTS

JRR: QWI v. BED


.15
.1
.05
0
1993q1
1997q3
2002q1
2006q3
2011q1
QWI: job reallocation rate
BED: Job Reallocation Rate

Different measures available



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!

VirtualRDC @ Cornell

Social Science Gateway, Synthetic Data Server, and more

Request access to the Social Science Gateway

To request an account on the Social Science Gateway (SSG), please click here.

Request access to the Synthetic Data Server

Account request procedures for the Synthetic Data Server (SDS) are described here.

Quicklinks

- Globus Online
- Login to compute nodes
- OnTheMap download
- QWI download
- Repositories
- VirtualRDC Wiki

Our other sites

- INFO 7470
- Labor Dynamics Institute
- NCRN-Cornell

Cornell

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

John Abowd and Lars Vilhuber, "**National Estimates of Gross Employment and Job Flows from the Quarterly Workforce Indicators with Demographic and Industry Detail**", draft February 10, 2010 (updated).

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

The paper was published in **Journal of Econometrics, Elsevier, vol. 161(1), pages 82-99, March 2011** (black-and-white graphs). A working paper version appeared in 2010 as **Center for Economic Studies Working Paper 10-11 (local copy)**, U.S. Census Bureau (color graphs).

Data

The most current data can be downloaded from

http://www.vrdc.cornell.edu/qwipu_national

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Site Navigation

- Documentation
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- Social Science Gateway
- Synthetic Data Server
- General Information
- Available resources
- Data @ VirtualRDC
  - Prototype National QWI
  - OnTheMap/LODES Synthetic Data
  - QWI Public Use Data
  - SIPP Synthetic Beta file
  - LBD Synthetic Data v2
  - Data archives

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

Industry	Demo-graphics	Firm age/ size	Owner-ship	Earliest beta Release	Planned official production release
NAICS Sector	SA	F	P	Fall 2014	R2015Q2
NAICS Sector	SE, RH	F	P	Fall 2014	R2015Q2
NAICS Sector	SA, SE, RH	FA, FS	P	2014Q4	R2015Q3
NAICS (3-digit)	SA, SE, RH	F	P	2015Q1	R2015Q4
NAICS (3-digit)	SA, SE, RH	FA, FS	P	2015Q2	R2015Q4

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

EXTRA SLIDES

Acknowledgements

- This research uses data from the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Program, which was partially supported by the following grants: National Science Foundation (NSF) SES-9978093, SES-0339191 and ITR-0427889; National Institute on Aging AG018854; and grants from the Alfred P. Sloan Foundation.
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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

$$WRR_{agskt} = \frac{A_{agskt} + S_{agskt}}{\left(B_{agskt} + E_{agskt}\right)/2}$$

- 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

$$JRR_{agskt} = \frac{JC_{agskt} + JD_{agskt}}{\left(B_{agskt} + E_{agskt}\right)/2}$$

- 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

$$WRR_{agt} = \frac{A_{agt} + S_{agt}}{\left(B_{agt} + E_{agt}\right)/2}$$

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

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

Implicate Combining Formulae I

$$\overline{WRR}_{agkt} = \frac{1}{M}\sum_{\ell=1}^{M}\left[\sum_{\forall s}\frac{\left(\frac{B^{(\ell)}_{agskt}+E^{(\ell)}_{agskt}}{2}\right)WRR^{(\ell)}_{agskt}}{\sum_{\forall \upsilon}\frac{B^{(\ell)}_{ag\upsilon kt}+E^{(\ell)}_{ag\upsilon kt}}{2}}\right]$$

$$\widehat{WRR}^{(\ell)}_{agkt} = \sum_{\forall s}\frac{\left(\frac{B^{(\ell)}_{agskt}+E^{(\ell)}_{agskt}}{2}\right)WRR^{(\ell)}_{agskt}}{\sum_{\forall \upsilon}\frac{B^{(\ell)}_{ag\upsilon kt}+E^{(\ell)}_{ag\upsilon kt}}{2}}$$

Implicate Combining Formulae II

$$V^{(\ell)}\left[\widehat{WRR}_{agkt}^{(\ell)}\right] = \frac{1}{49}\sum_{\forall s}\frac{\left(\frac{B_{agskt}^{(\ell)} + E_{agskt}^{(\ell)}}{2}\right)\left(WRR_{agskt}^{(\ell)} - \widehat{WRR}_{agkt}^{(\ell)}\right)^2}{\sum_{\forall \upsilon}\frac{B_{ag\upsilon kt}^{(\ell)} + E_{ag\upsilon kt}^{(\ell)}}{2}}$$

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

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

Implicate Combining Formulae III

$$MR\left[\overline{WRR}_{agkt}\right] = \frac{B\left[\overline{WRR}_{agkt}\right]}{T\left[\overline{WRR}_{agkt}\right]}$$

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)