

LODES/OnTheMap Training

LED Partnership Workshop

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Virtual

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Disclaimer

- Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

Agenda

- Intro/Level Setting (5-10m)
- LODES Overview (as needed, 5-10m)
- OnTheMap Overview (as needed, 5-10m)
- OnTheMap Practice (20-30m)
- LODES Walkthrough (as needed, 15-20m)
- Q&A (15m)



Intro/Level Setting

Where are we?

Would you feel comfortable explaining the following to a new work colleague?

- LEHD (or LED)
- Showing them something cool you found in OnTheMap
- How you found the cool thing in OnTheMap
- What the cool thing in OnTheMap means
- Basic information about the LODES dataset (variables, characteristics)
- Detailed info about LODES (coverage, caveats)
- The strengths/weaknesses of LODES

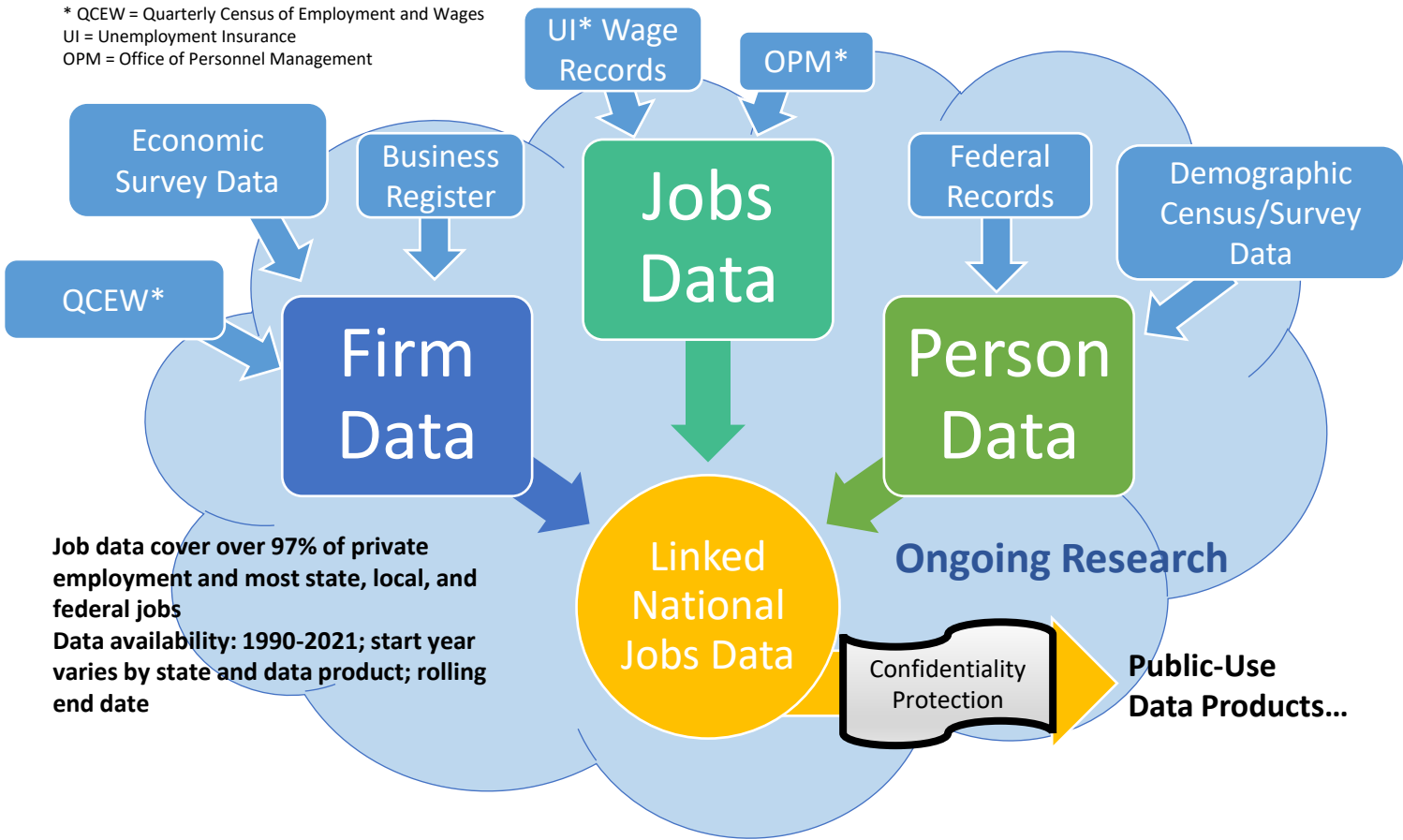
In what content are you most interested?



What are LEHD and LED?

- LEHD (Longitudinal Employer-Household Dynamics)
 - The LEHD Program at the US Census Bureau has constructed unique linked employer-employee data for the United States.
 - It connects administrative records with census and survey data to produce new public-use data products as well as microdata for research.
- LED (Local Employment Dynamics) Partnership
 - LEHD accesses state data through the LED Partnership - a cooperative partnership with states and DC, PR, and USVI
 - State-provided data:
 - Unemployment Insurance (jobs/workers)
 - Quarterly Census of Employment and Wages (firms)
 - Other data available to the Census Bureau
 - Censuses, Surveys, and Tax Information

LEHD Data Infrastructure



Data Products

- Quarterly Workforce Indicators (QWI)
 - 32 indicators by
 - Industry (NAICS 2, 3, and 4-digit), Firm Age, Firm Size
 - Worker Age, Race, Ethnicity, Sex, Education
 - State, County, CBSA, WIB Area
 - >150 Million job records processed each quarter
 - Longitudinal series starts in 1990 for some states
- LEHD Origin-Destination Emp. Statistics (LODES)
 - Connects a job/worker's employment and residential locations
 - Data at census block detail
 - Less characteristic detail than QWI
- Job-to-Job Flows (J2J)
 - Flows between jobs as well as into/out of nonemployment
- Post-Secondary Employment Outcomes (PSEO) – Experimental
 - Provides earnings and employment outcomes for select college/university graduates by degree level, degree major, and post-secondary institution. Some coverage in 17 states (plus 6 agreements for forthcoming data).
- Veteran Employment Outcomes (VEO) – Experimental
 - Provides earnings and employment outcomes for recently discharged Army veterans.

LEHD Data Products

What do you want?	Scope	Data Product
Employment, hires, separations, turnover, or earnings by detailed firm and person characteristics; quarterly time resolution; relatively short data lag	32 Indicators published quarterly, 150 million jobs records processed each quarter.	QWI
Employment for detailed or customized geography; residential patterns of the workforce; relationship between worker employment and home locations	Connects employment and residential locations, census block level.	LODES
Transitions between jobs by timing and firm or worker characteristics; transitions to/from nonemployment	Worker characteristics by firm characteristics.	J2J
Labor market outcomes for specific degree programs at selected colleges/universities	Earnings percentiles for specific grad. cohorts at certain times.	PSEO (Experimental)
Labor market outcomes for recently discharged Army veterans	Earnings percentiles for specific cohorts at certain times.	VEO (Experimental)

Dissemination Tools/Applications

- J2J Explorer
 - j2jexplorer.ces.census.gov
 - Dashboard-style analysis tool for Job-to-Job Flows
- OnTheMap
 - onthemap.ces.census.gov
 - Map-based analysis tool for LODES
- OnTheMap for Emergency Management
 - onthemap.ces.census.gov/em.html
 - Integrates live feeds of emergency/disaster areas
- QWI Explorer
 - qwiexplorer.ces.census.gov
 - Dashboard-style analysis tool for QWI
- LED Extraction Tool
 - ledextract.ces.census.gov
 - Provides precise extracts of data (QWI only for now)
- PSEO Explorer
 - lehd.ces.census.gov/applications/pseo/
 - Dynamic bar/flow charts for Post-Secondary Employment Outcomes
- VEO Explorer
 - lehd.ces.census.gov/applications/veo/
 - Dynamic bar charts for Veterans Employment Outcomes

Choosing Among LED Data Access Points

Data Product	Explore the data, answer questions, or get visualizations	Bulk data for use in analysis process/software	Live queries for building web applications
QWI	QWI Explorer	LED Extraction Tool Raw data download	Census Bureau API
LODES	OnTheMap OnTheMap for Emergency Management	Raw data download LED Extraction Tool – Coming in 2023	Future development
J2J	Job-to-Job Explorer	Raw data download LED Extraction Tool – Coming in 2022	Future Development
PSEO	PSEO Explorer	Raw data download	Census Bureau API
VEO	VEO Explorer	Raw data download	Future Development

LEHD Origin-Destination Employment Statistics (LODES) Overview

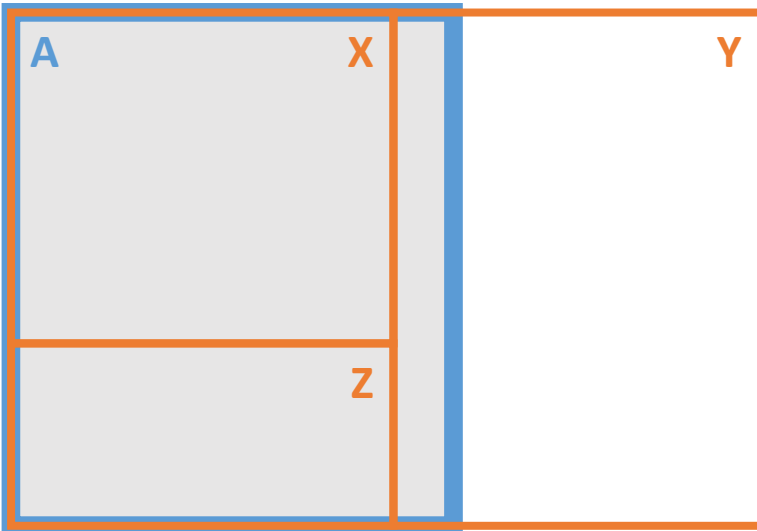
LODES/OnTheMap Update Redux

- Last Year
 - 2019 LODES was released; 2019 TIGER; Firm age/size data backfilled
 - LODES is being included in the [criteria for defining urban areas](#)
- This Year: 2020 LODES
 - Planned for Summer 2022
 - 2020 data will be produced using 2020 census blocks
 - Currently LODES is baselined to 2010 census blocks
 - OnTheMap will be updated to new geography as well (2021 TIGER)
 - Historical LODES data will be converted from 2010 to 2020 census blocks
- Looking into the future...

Converting LODES to New Census Blocks

- Using the [same method as we did for 2000→2010](#)
 - For each 2010 block, and calculate the % of areal intersections with 2020 blocks
 - For each job in the 2010 block, we randomly choose an intersecting 2020 block using the areal share as a weight.
 - Repeat for residence and employment locations, for all years of data

2010 Census Block "A":
5 jobs



2020 Census Blocks "X", "Y", and "Z"

2020 Block	Areal Intersection of A [%]
X	56%
Y	13%
Z	31%

Job	Random Draw	Assigned 2020 Block
"1"	0.35	X
"2"	0.37	X
"3"	0.68	Y
"4"	0.92	Z
"5"	0.23	X

X: 3 jobs
Y: 1 job
Z: 1 job

What is LODES?

(LEHD Origin-Destination Employment Statistics)

- Developed in mid-2000s as way to get spatially detailed commuting-like information from the LEHD data infrastructure
- Geographic patterns of jobs
 1. by employment locations
 2. and residential locations
 3. as well as the connections between the two
- Tabulated by several categorical variables
 - Age, Earnings, and Industry
 - Sex, Race, Ethnicity, and Education
 - Firm Age and Firm Size
 - Ownership, Job Dominance, and Job Type
- Raw data files available at: lehd.ces.census.gov/data/#lodes

Details About LODES

(See LODES 7.5 Documentation: <https://lehd.ces.census.gov/data/lodes/LODES7/LODESTechDoc7.5.pdf> for more info.)

- Employment: Counts of “beginning-of-quarter” jobs
- Job Type:
 - A cross of ownership and job dominance (which job earns a worker the most \$)
- Labor Market Segment
 - 10 categories: 3 earnings, 3 industry, 3 worker age, 1 total
 - Used for both OD and residence/workplace margins
- Characteristics
 - 51 categories: 3 earnings, 20 industry, 3 worker age, 2 worker sex, 6 worker race, 2 worker ethnicity, 4 education, 5 firm age, 5 firm size, 1 total
 - Used only on residence/workplace margins, crossed with labor market segments*

More Details About LODES

(See LODES 7.5 Documentation: <https://lehd.ces.census.gov/data/lodes/LODES7/LODESTechDoc7.5.pdf> for more info.)

- File Types:
 - **rac** – Residence Area Characteristics
 - **wac** – Workplace Area Characteristics
 - **od** – Origin-Destination; 2 flavors:
 - **main** – Work in state and live *in state*
 - **aux** – Work in state and live *out of state*
- File organization:
 - State, file type, year, job type (ownership/dominance), labor market segment, characteristic
 - Example: `ak_rac_S000_JT00_2015.csv.gz` is a
 - Gzipped CSV file (“`.csv.gz`”) containing
 - Residence data (“`rac`”)
 - For Alaska (“`ak`”)
 - In the Total labor market segment (“`S000`”)
 - In 2015

LODES Coverage “Scorecard”

Year(s)	Count of Available States	Missing Employment in States/Territories ¹	Federal Jobs	Race, Ethnicity, Education, Sex variables	Firm Age, Firm Size variables ²
2002	46	Arkansas, Arizona, DC, Massachusetts, Mississippi	No	No	No
2003	47	Arizona, DC, Massachusetts, Mississippi	No	No	No
2004-2008	49	DC, Massachusetts	No	No	No
2009	49	DC, Massachusetts	No	Yes	No
2010	50	Massachusetts	Yes	Yes	No
2011-2016	51	(none)	Yes	Yes	Yes
2017-2018	50	Alaska	Yes	Yes	Yes
2019	48	Alaska, Arkansas, Mississippi	Yes	Yes	Yes

¹ Employment data in Puerto Rico and the U.S. Virgin Islands are missing from all years of LODES.

² Firm Age and Firm Size variables are only available on the All Private Job Type (JT02).

LODES Variable Crossings

Data Type	Residence Block	Workplace Block	Labor Market Segments	Characteristics		
			Total, Industry (3), Earnings (3), Worker Age (3)	Total, NAICS Sector (20), Earnings (3), Worker Age (3)	Race (6), Ethnicity (2), Education (4), Sex(2) ¹	Firm Age (5), Firm Size (5) ²
Origin-Destination (OD)	Yes	Yes	Yes	No		
Residence Area Characteristics (RAC)	Yes	No	Yes	Yes	Yes	No
Workplace Area Characteristics (WAC)	No	Yes	Yes	Yes	Yes	Yes

¹ Race, ethnicity, education, and sex: Only in available years.

² Firm age and firm size: Only in available years and only for All Private Job Type (JT02).

OnTheMap Overview

What is OnTheMap

- OnTheMap provides an interface for interacting with the LODES data
- A resource for
 - mapping the employment patterns of workers
 - identifying small-area workforce characteristics
- Outputs maps, charts, tables, and some reports summarizing answers to questions where jobs are located and where workers holding those jobs live.
- OnTheMap Documentation:
lehd.ces.census.gov/applications/help/onthemap.html

OnTheMap Basic Details

- All years of data (2002-2019) available.
- Only 4 of the 6 job types available (federal employment as a separate job type is not accessible via the application)
- 6 analysis types
- Any supported legal/statistical areas (20+) plus custom areas can be used for analyses
- Imports from various spatial data sources and exports to PDF, Excel, Images, etc.

LODES/OnTheMap References

- LODES

- [LODES Data Overview](#)
- [LODES Data Notices](#)
- [LODES Technical Doc](#)
- [Design Comparison of LODES and ACS Commuting](#)
- [Microdata Comparison of LODES and ACS Commuting](#)
- [LODES and Confidentiality Protection](#)
- [LED in Action: LODES](#)

- OnTheMap

- [OnTheMap Help](#)
- [OnTheMap Analysis Guides](#)
- [Additional OnTheMap Tutorials](#)
- [FAQs](#)
- [LED in Action: OnTheMap](#)

OnTheMap Practice

OnTheMap Basic Walkthroughs

- Go to Analysis Guides page of OnTheMap Help:
lehd.ces.census.gov/applications/help/onthemap.html#!analysis_guides
- We'll work through two of them:
 - Area Profile:
lehd.ces.census.gov/doc/help/onthemap/OnTheMapSampleWorkAreaProfileAnalysis.pdf
 - Destination:
lehd.ces.census.gov/doc/help/onthemap/OnTheMapSampleDestAnalysis.pdf
- Try out the others!

Walkthroughs/Demos of OnTheMap

onthemap.ces.census.gov

More Advanced Features

- Homing in on specific labor market segments/characteristics.
- Defining custom analysis areas.
- Paired Area analyses.
- Imports and exports.

Questions and Answers

Questions – For You!

Time to think like an application developer...

- What are your favorite features of OnTheMap?
 - Can't live without it?
 - Very useful?
 - Nice to have?
- How does OnTheMap get in the way of your analyses?
 - Workflow?
 - Perception?
 - Confusion?
- What features would you like to see in OnTheMap?
 - Functionality?
 - Other datasets?
- What features would you like to see in the LODES?
 - Variables, different crossings, categories...
 - What's “missing” from the perspective of your particular analyses?

Getting Help

- First: Read the Docs 😊
- Second: Email us!
 - LODES/OnTheMap/OnTheMap for Emergency Management: CES.OnTheMap.Feedback@census.gov
 - General LEHD/LED Questions: CES.Local.Employment.Dynamics@census.gov
 - These email addresses are monitored by several people, so it's the fastest way to get a response.