



# An overview of Longitudinal Employer-Household Dynamics (LEHD) data products

LEHD combines federal, state and Census Bureau data on employers and employees to produce statistical data products.

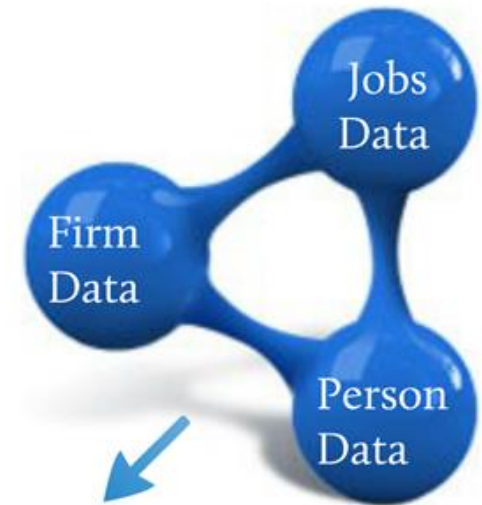
Henry Hyatt  
Center for Economic Studies  
U.S. Census Bureau

2022 Roundtable on Evaluating Economic Development Tax Incentives  
National Conference of State Legislatures  
November 3, 2022

Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau.

Longitudinal Employer-Household Dynamics (LEHD) - [lehd.ces.census.gov](https://lehd.ces.census.gov)  
Overview

- An innovative data suite at Census leveraging administrative data to produce new statistics at low cost with no additional respondent burden
- Partners with states, educational institutions, and the military to obtain administrative data on jobs; integrates this data with other censuses, surveys, and federal administrative record data
- Worker demographics, industry, geography, firm characteristics



New linked national jobs data for the U.S.

# 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.	Quarterly Workforce Indicators (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.	LEHD Origin Destination Employment Statistics (LODES)
Transitions between jobs by timing and firm or worker characteristics; transitions to/from nonemployment	Worker characteristics by firm characteristics.	Job-to-Job Flows (J2J)
Labor market outcomes for specific degree programs at selected colleges/universities	Earnings percentiles for specific grad. cohorts at certain times.	Post-Secondary Employment Outcomes
Labor market outcomes for recently discharged Army veterans	Earnings percentiles for specific cohorts at certain times.	Veteran Employment Outcomes

## Quarterly Workforce Indicators (QWI)

Measures of local workforce dynamics (hires, separations, job creation, job destruction, etc.), by detailed industry, with demographics



# The Amazon That Customers Don't See

Each year, hundreds of thousands of workers churn through a vast mechanism that hires and monitors, disciplines and fires. Amid the pandemic, the already strained system lurched.

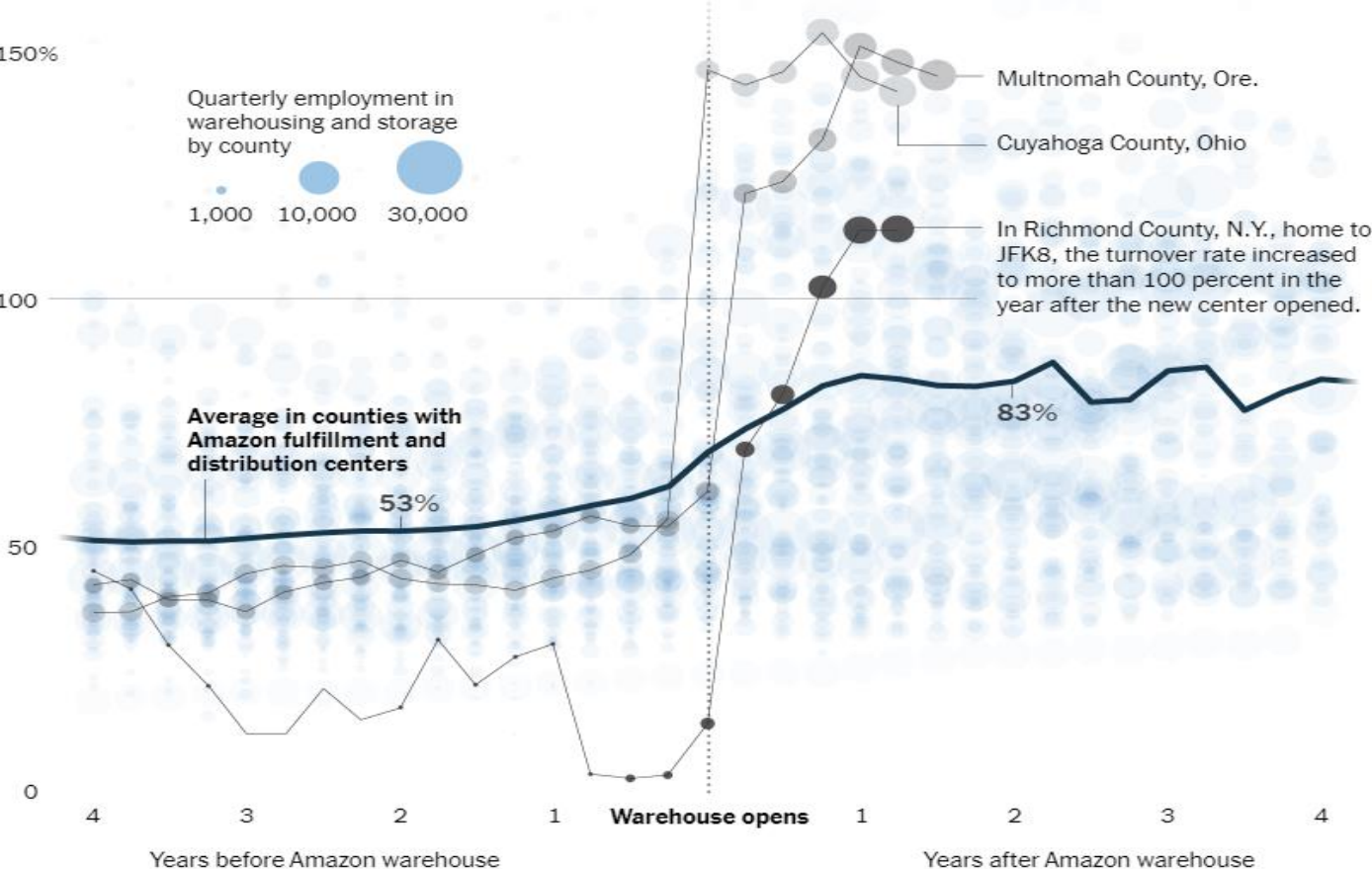
By [Jodi Kantor](#), [Karen Weise](#) and [Grace Ashford](#)  
June 15, 2021



# Amazon's Turnover Outpaces Its Peers'

Amazon is so large, and its churn so high, it affects the industry turnover rate where it operates, according to a Times analysis. In the two years after Amazon opened a new facility, the county turnover rate of warehousing and storage employees rose an average of 30 percentage points compared with two years prior.

**Yearly turnover rate for warehousing and storage employees**



Sources: U.S. Census Bureau, Quarterly Workforce Indicators; MWPVL International. [Read more about the analysis.](#)



### Geography Level 📍

Ohio ▼

### Indicator 📊

Emp - Beginning of Quarter Employme ▼

📄 Get Data 🔄 Share 🖨️ Get Report

### Filters/Aggregations 🗑️ 📍

Time: X-Axis

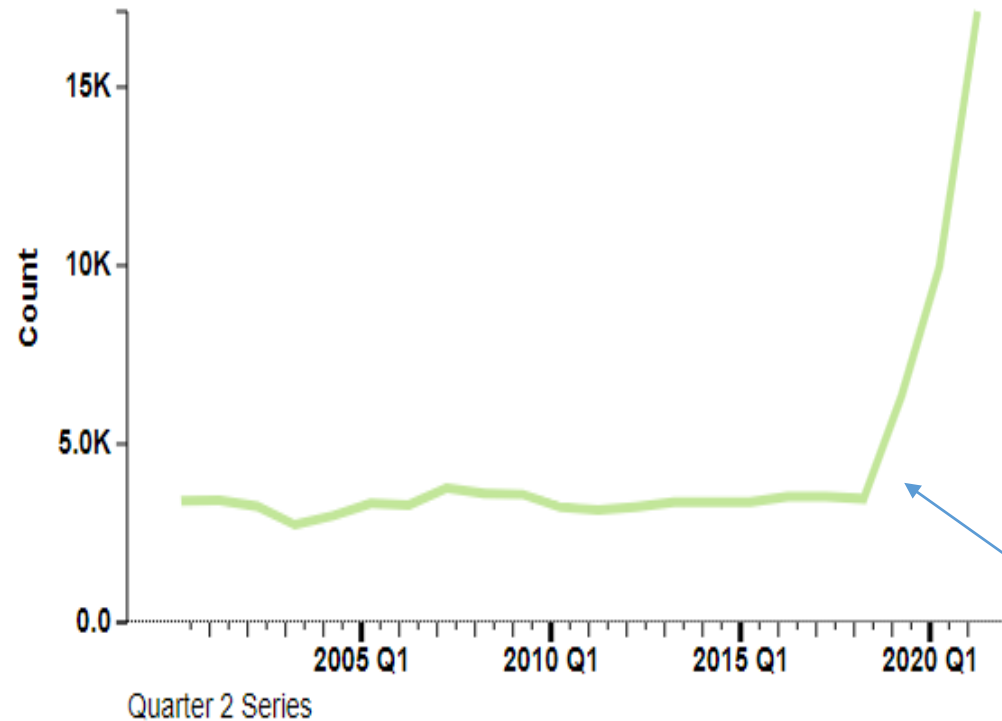
Counties: [Cuyahoga](#)

NAICS 4-digit Industries: [Warehousing and Storage](#)

Firm Ownership: [All Private Ownership](#)

Firm Age/Size: [None](#)

Worker Characteristics: [None](#)



## Amazon commits to North Randall fulfillment center, with 2,000-plus jobs on former mall site

Updated: Jan. 11, 2019, 3:40 p.m. | Published: Aug. 25, 2017, 1:15 p.m.



By [Michelle Jarboe, The Plain Dealer](#)

Amazon-Target

Amazon has committed to opening a massive fulfillment center in the tiny Cuyahoga County village of North Randall, where more than 2,000 people could find jobs.

**Geography Level** ⓘ

Ohio ▼

**Indicator** ⓘ

HirAEndReplR - Replacement Hiring F ▼

📌 Get Data   🔄 Share   🖨️ Get Report

**Filters/Aggregations** 🗑️ ⓘ

Time: X-Axis

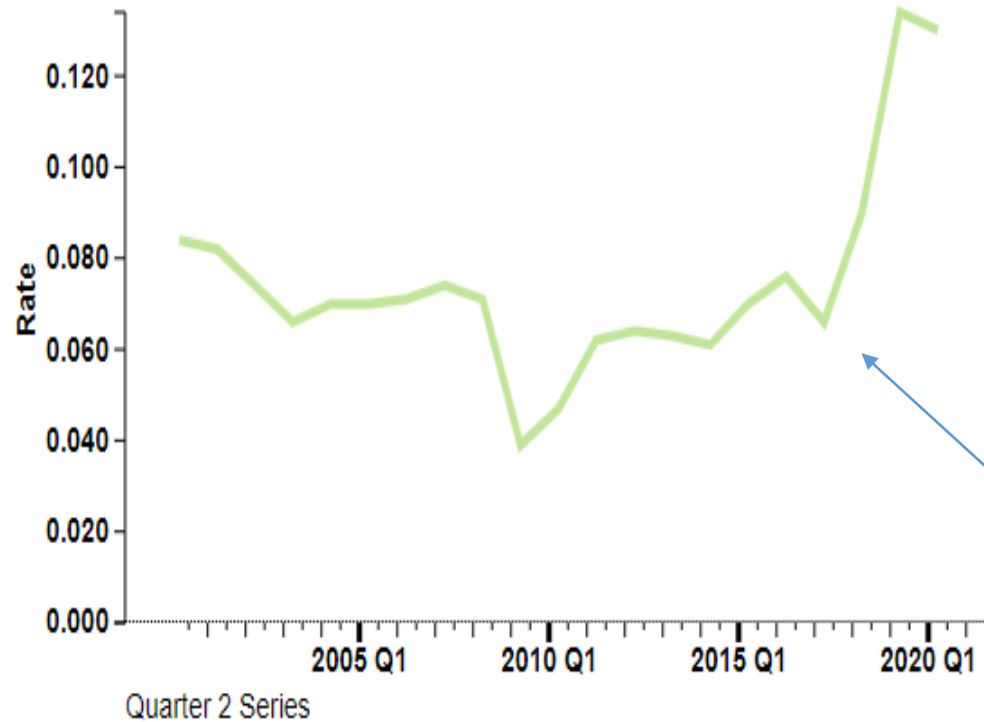
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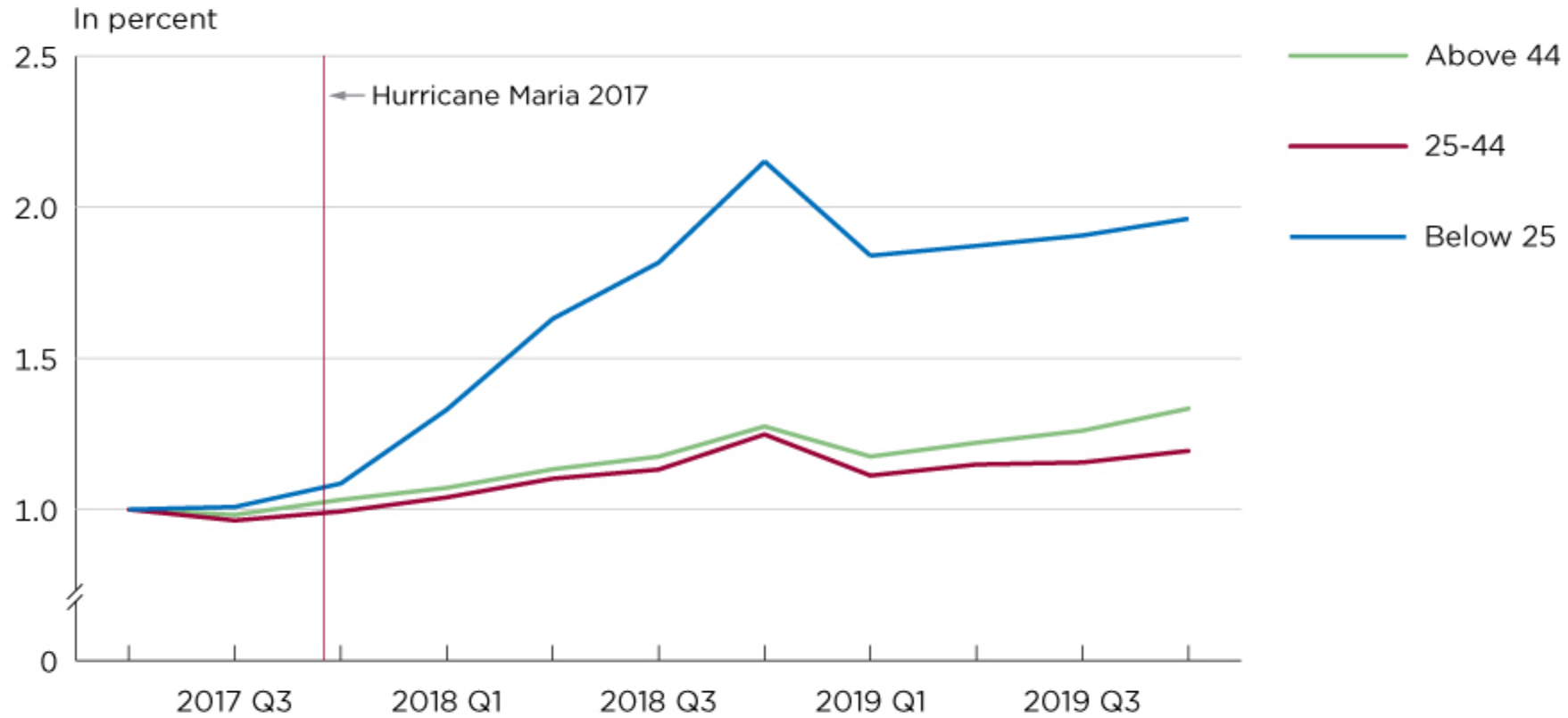
# Youngest and Oldest Workers Drove Job Recovery After Hurricane Maria



Figure 5.

## Puerto Rico Construction Employment by Age

(Indexed to Pre-Hurricane Maria employment)



Source: U.S. Census Bureau, Quarterly Workforce Indicators R2022Q3, Beginning of Quarter Employment (Not seasonally adjusted).

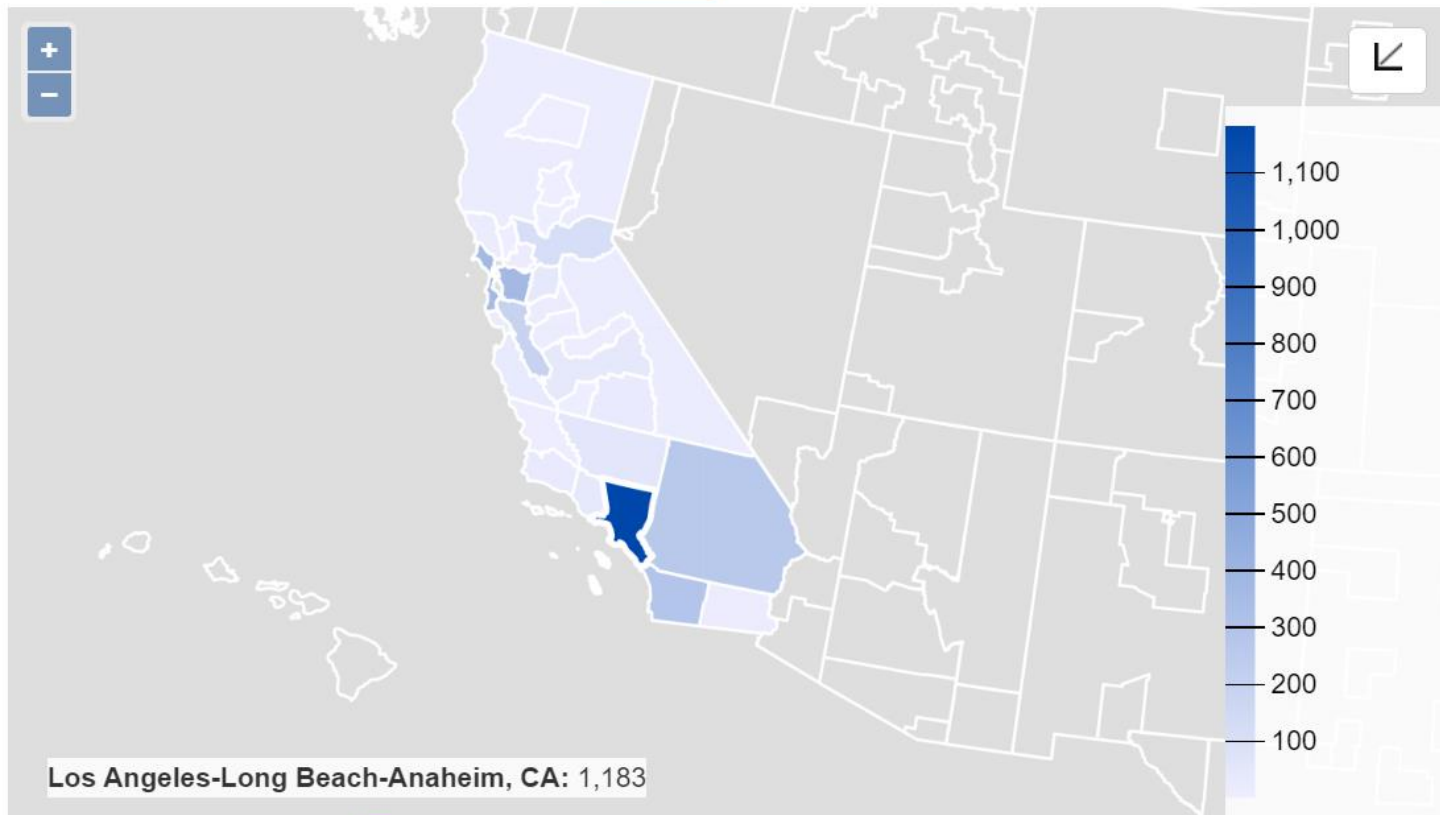
# Job-to-Job Flows (J2J)

Measures of employer-to-employer transitions and transitions to/from nonemployment across locations and industries, with demographics

# See how many Californians moved to Dallas in just 3 months last year

There were 1,051 moves from coastal California, the home of some of the country's toughest housing markets, to Dallas in the first quarter of 2017.





Los Angeles-Long Beach-Anaheim, CA: 1,183

Geography not mapped  Filtered Destination Metro Area

## Job-to-Job Flows from 27 Metro Areas to Dallas-Fort Worth-Arlington, TX

2017 Q1

### Indicator ?

Job-to-Job Flows (J2J)

Job flows with a short or no observed nonemployment spell

### Geography Level ?

Origin Metro Area

Bakersfield, CA, Chico, CA, El Centro, CA, Fresno, CA, Hanford-Corcoran, CA and 22 Others

### Filters ?

#### Time

Year/Quarter

2017 Q1

#### Firm Characteristics

#### Worker Characteristics

Sex

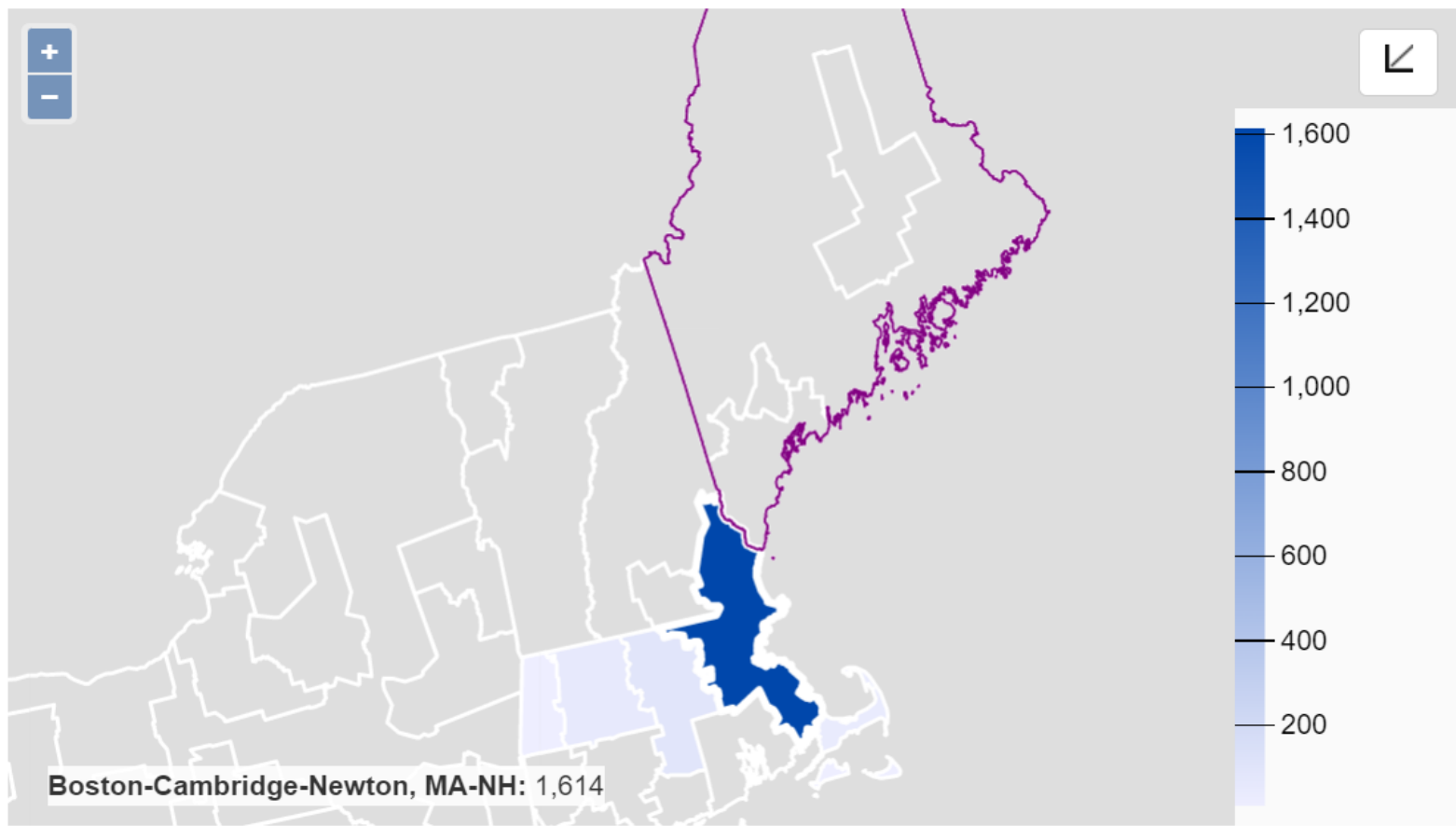
All

## Workers from Massachusetts helped drive pandemic migration to Maine

by Jessica Piper, Bangor Daily News | Thursday, April 21st 2022



Table
Line
Bar
**Map**
Bipartite
Matrix
Go full screen
Export data



## Job-to-Job Flows from 6 Metro Areas to Maine

2021 Q3

### Indicator ?

Job-to-Job Flows (J2J) ▼  
 Job flows with a short or no observed nonemployment spell

### Geography Level ?

Origin Metro Area ▼  
Barnstable Town, MA, Boston-Cambridge-Newton, MA-NH, Not in metropolitan area, MA, Pittsfield, MA, Springfield, MA and 1 Others

### Filters ?

#### Time

Year/Quarter  
2021 Q3

#### Worker Characteristics

Sex  
 All

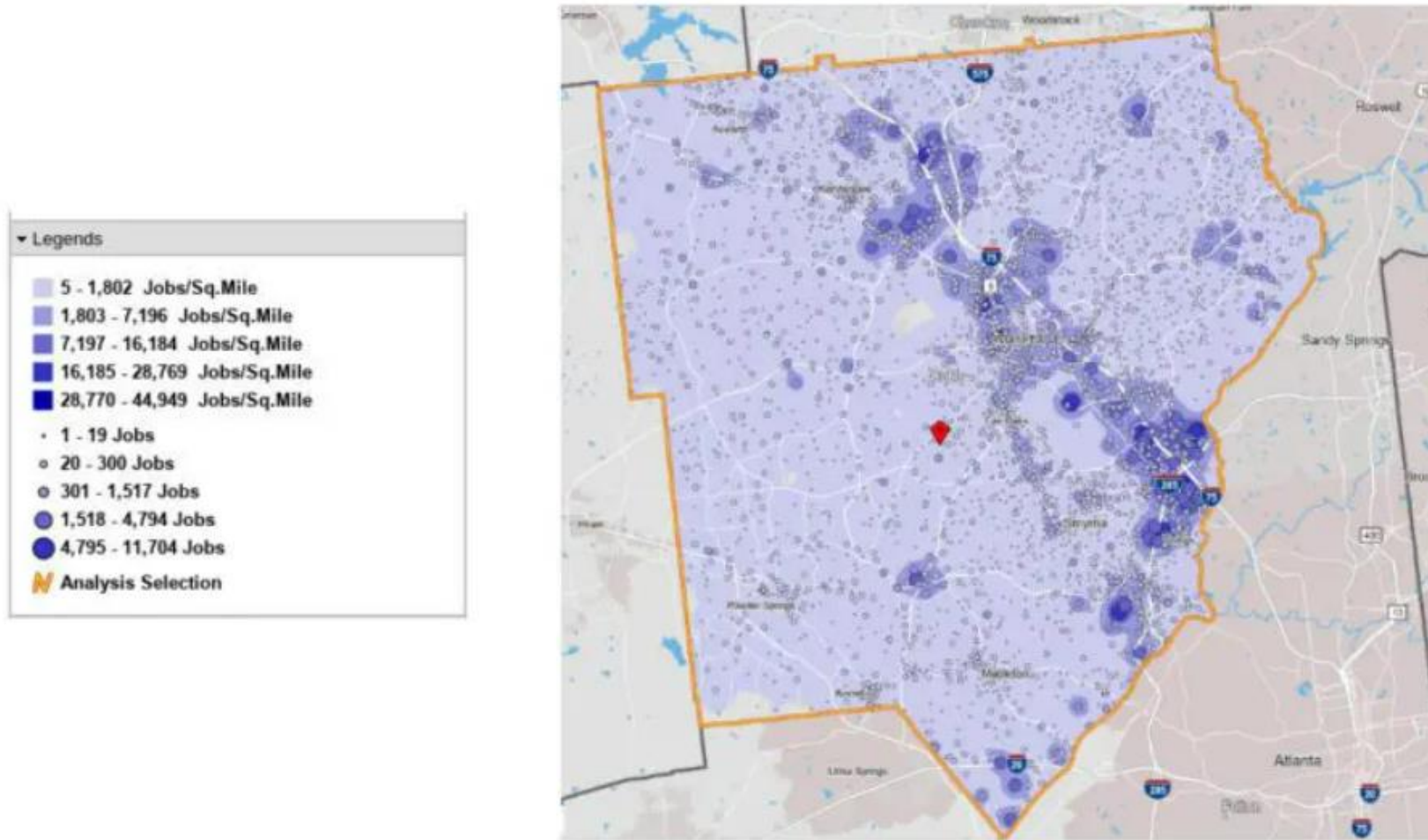
Geography not mapped  Filtered Destination State

# LEHD Origin-Destination Employment Statistics (LODES) and OnTheMap

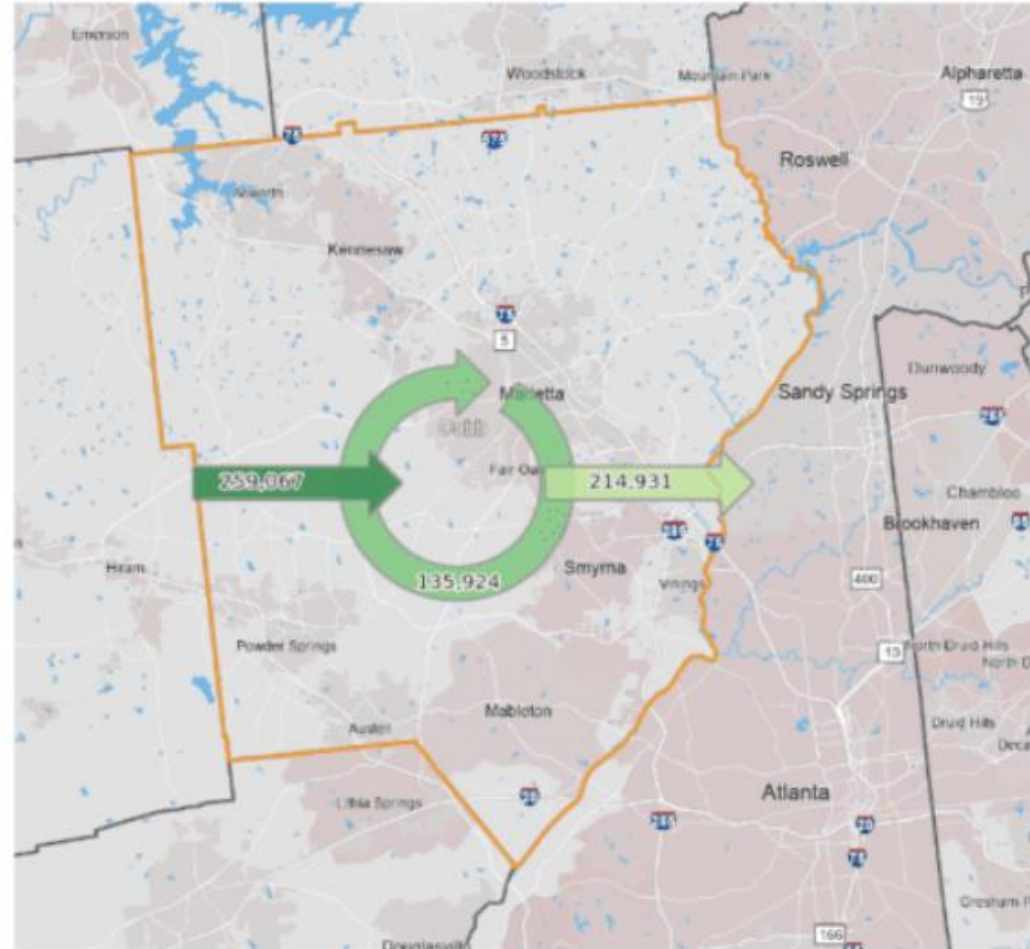
Detailed statistics on where the workforce lives and works



# A Look At Where Jobs Are Concentrated In Cobb County



# How Many People Commute To Cobb To Work? How Many Live In Cobb But Work Outside The County?



Map of employment commute flow in Cobb County (from the U.S. Census Bureau)

# OnTheMap for Emergency Management



Hurricanes, Floods,  
Winter Storms



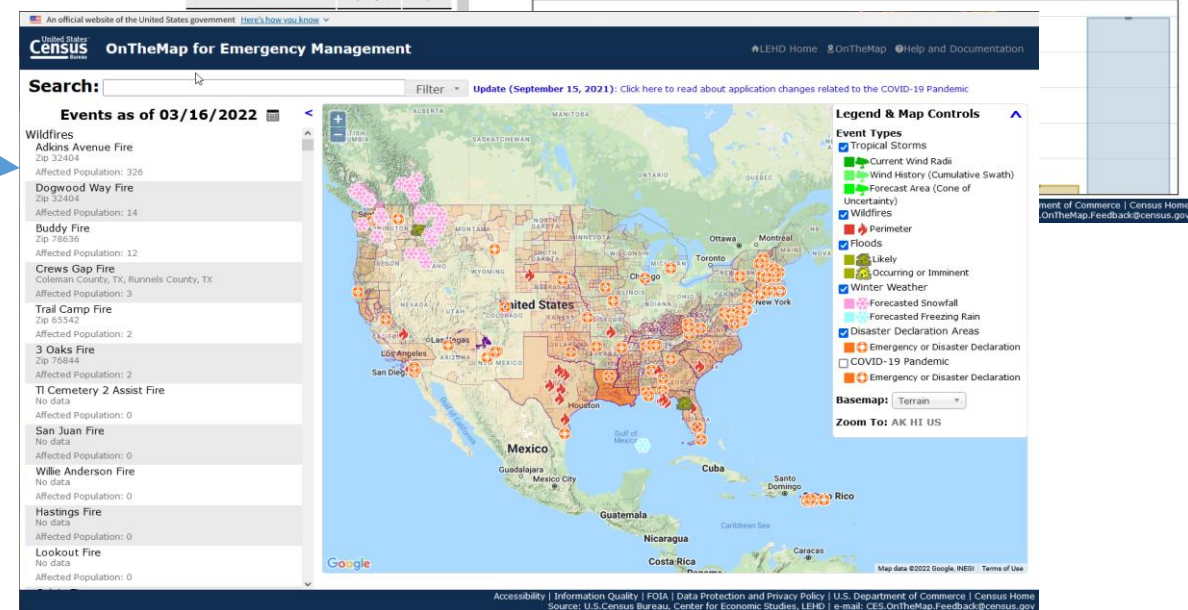
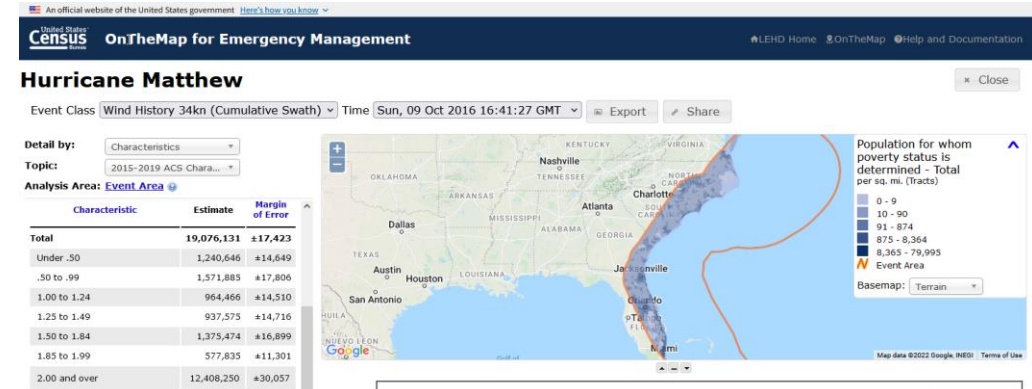
Disaster Areas



Wildfires



Demographic &  
Economic Data



[onthemap.ces.census.gov/em/](https://onthemap.ces.census.gov/em/)

# Emergency management leaning on state Census office to identify communities of need ahead of Ian

"Data aren't just numbers," he said. "These are people."

Posted 11:33 p.m. Sep 29 — Updated 11:43 p.m. Sep 29

[Switch to classic WRAL.com](#)



**Hurricane Ian** Event Class  Time

**Detail by:**

**Topic:**

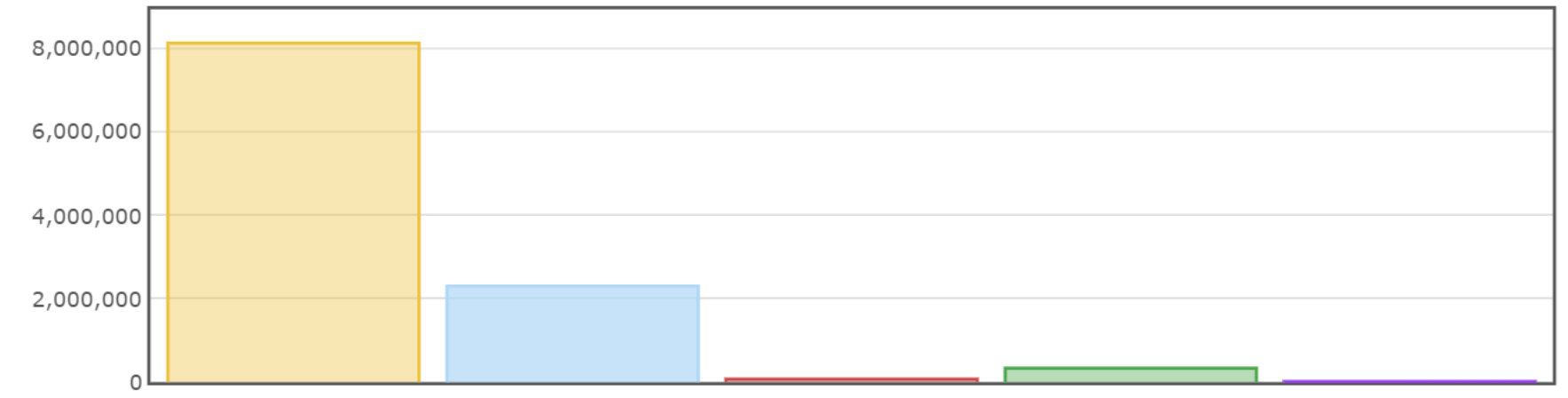
**Analysis Area:** [Event Area](#)

**Workers by Race**

**Universe: All Workers**  
LEHD Origin-Destination Employment Statistics (LODES)  
[Source info >>](#)

Characteristic	Count	Share
Total	10,997,280	100.00%
White Alone	8,117,210	73.81%
<b>Black or African American Alone</b>	<b>2,302,754</b>	<b>20.94%</b>
American Indian or Alaska Native Alone	67,688	0.62%
Asian Alone	331,761	3.02%
Native Hawaiian or Other Pacific Islander Alone	12,007	0.11%

**Workers by Ethnicity**



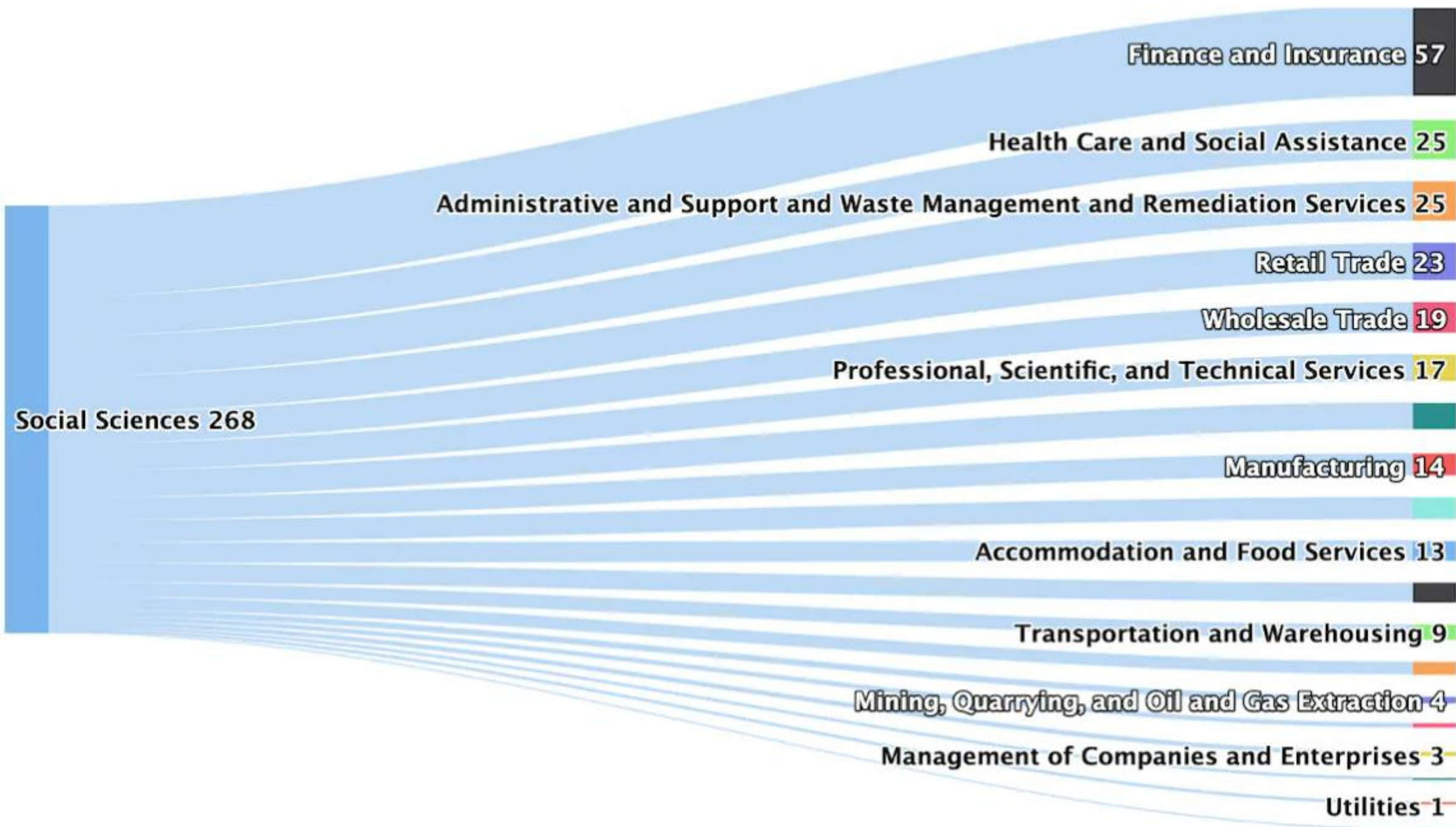
# Post-Secondary Employment Outcomes (PSEO)

Earnings and job characteristics of recent college graduates

# This New Census Tool Can Recruit Students into the Liberal Arts

By Jake Docking Apr 4, 2022



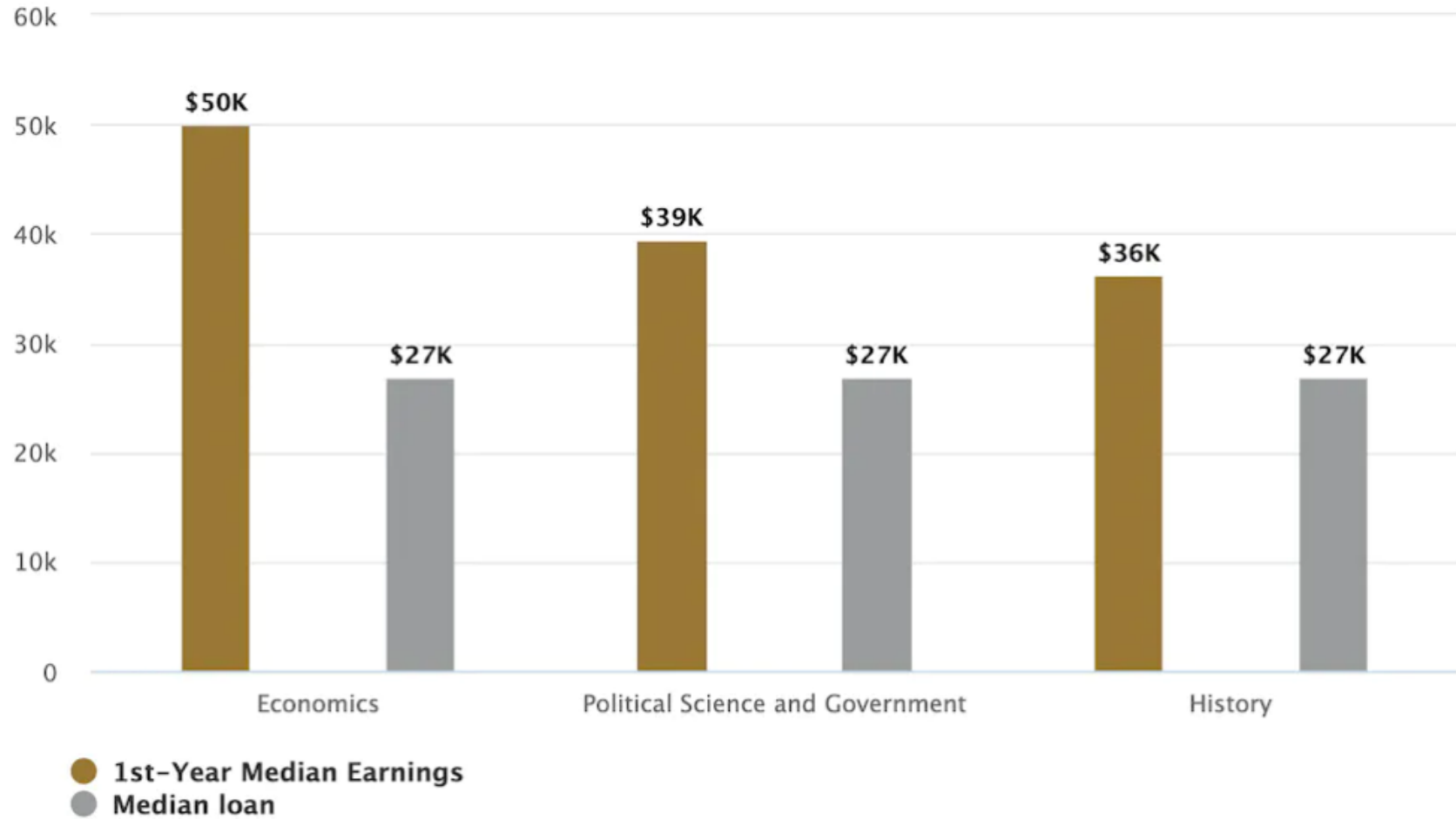




## How much do ICI graduates earn nationally, and how much do they owe in student loans? How much do earnings vary for ICI graduates with the same major?

PSEO data published by the Census Bureau's LEHD program can be compared with student loan data available from other data providers.

### 1st-Year Median Earnings and Median Loan



# Veteran Employment Outcomes (VEO)

Earnings of army veterans after discharge, with detail on military specialization, demographics, as well as industry and state of post-military employment

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# San Angelo has earned its distinction as a military-friendly city

**Kenneth L. Stewart** Angelo State University

Published 10:59 a.m. CT July 2, 2021 | Updated 11:11 a.m. CT July 2, 2021

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**Census**  
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MILITARY SPECIALIZATION ▾ SERVICE CHARACTERISTIC ▾ DEMOGRAPHIC ▾ **INDUSTRY ▾** STATE ▾ HELP 



Industry

6 Industries Selected

Select Multiple Characteristics




Cohort

All Cohorts

Earnings for Employed Veterans by Industry

Data Type

 Earnings

Percentiles

50%

Years Post Discharge

5



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LEHD Landing Page - [lehd.ces.census.gov](http://lehd.ces.census.gov)

General Questions	<a href="mailto:CES.Local.Employment.Dynamics@census.gov">CES.Local.Employment.Dynamics@census.gov</a>
LODES/OnTheMap	<a href="mailto:CES.OnTheMap.Feedback@census.gov">CES.OnTheMap.Feedback@census.gov</a>
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# Using LEHD LODES to Examine Impacts of the New Markets Tax Credit Program

# Overview

- We examine the relationship between NMTC projects and neighborhood economic and demographic change
  - We create a typology of NMTC projects and map them to their intended outcomes
  - We use difference-in-differences and event studies to understand impacts
- We see evidence of economic growth (in jobs and number of businesses)
- But relationship might not be causal
- And it is not clear whether pre-existing residents share the benefits because new people move in

# What is the New Markets Tax Credit Program?



# The New Markets Tax Credit Program...

- provides federal tax credits to attract private investment into distressed communities.
- was designed to spur investment and economic development in neighborhoods otherwise neglected by private capital.
- is place-based, with eligibility criteria at the census tract level dependent on poverty rate and median family income.

# How It Works

- The program provides taxpayers with federal income tax credits for making investments into certified organizations.
- Certified organizations invest in local businesses located in low-income communities.
- Taxpayers may reduce their federal income taxes up to 39 percent of the amount of the investment.

# Types of New Markets Tax Credit-Funded Projects

- Retail
- Manufacturing and food processing
- Health care services
- Schools and child care
- Office and professional services
- Community facilities
- Market-rate residential
- Hotels
- Services for vulnerable populations
- Energy, water, waste, and sewage
- Forest, agriculture, mining and quarry
- Transport, warehouse, and wholesale
- Affordable residential
- Investments in CDEs

# What economic impact do these tax credits have on neighborhoods?

- **Jobs (LODES)**
- **Residents with Jobs (LODES)**
- Firms (Data Axle)
- Median Income (ACS)
- Poverty Rate (ACS)
- Population (ACS)
- Population over 25 with a bachelor's degree (ACS)
- Turnover Rate (ACS)

# LEHD Origination-Destination Employment Statistics (LODES)

# Why LODES Data

- Accurate - generated from Administrative data sources (primarily unemployment insurance and QCEW data), as well as census/surveys.
- Available at the block level (small level of geography)
- Public
- Longitudinal

# LODES Data Aggregation

Data is available at the block level across 50 states + DC, for up to 16 years per state or district.

About ~11 million blocks per year \* 16 years \* Job Type = A large dataset

# LODES Data Aggregation

- We use Apache Spark, an engine for large-scale data processing, to aggregate the data to the census tract, place (city), and Zip Code Tabulation Area levels.
- We release all three aggregations on our [Urban Data Catalog](#).



# Other Options

- [lehdr](#) is an R package that queries tables from LODES.as data frames.
  - Has block, block group, tract, county, and state
- [lehd](#) is a python package that downloads data into pandas DataFrames.
  - Has block, block group, tract, place, county subdivision, county, and state
- Download directly from the [LEHD website](#).

# Methods

# NMTC Program Data

- Public data from the US Department of Treasury CDFI Fund
  - Lists each project's origination year, census tract location, project QLICI amount (the NMTC contribution to the project), and total project amount, among other variables
- Proprietary dataset on NMTC projects from the New Markets Tax Credit Coalition.
  - Includes an industry variable which categorizes each NMTC project into one of 160 distinct industries

## Hypotheses by Project Type and Outcome

Project type	Firms	Jobs	Median income	Poverty rate	Pop.	Pop. w/ bachelor's degree	Turnover rate
Affordable residential	none	none	none	none	+	-	none
Community facilities	none	+	+	-	+	+	+
Energy, water, waste, and sewage	none	+	+	-	-	-	none
Forest, agriculture, mining, and quarry	none	+	+	-	none	none	none
Health care services	+	+	+	-	+	+	+
Hotels	+	+	+	-	none	none	+
Manufacturing and food processing	+	+	+	-	-	-	none
Market-rate residential	none	none	none	-	+	+	+
Office and professional services	+	+	+	-	none	none	none
Retail	+	+	+	-	+	+	+
Schools and child care	none	+	none	-	none	none	+
Services for vulnerable populations	none	+	none	-	-	-	none
Transport, warehouse, and wholesale	none	+	+	-	-	-	none

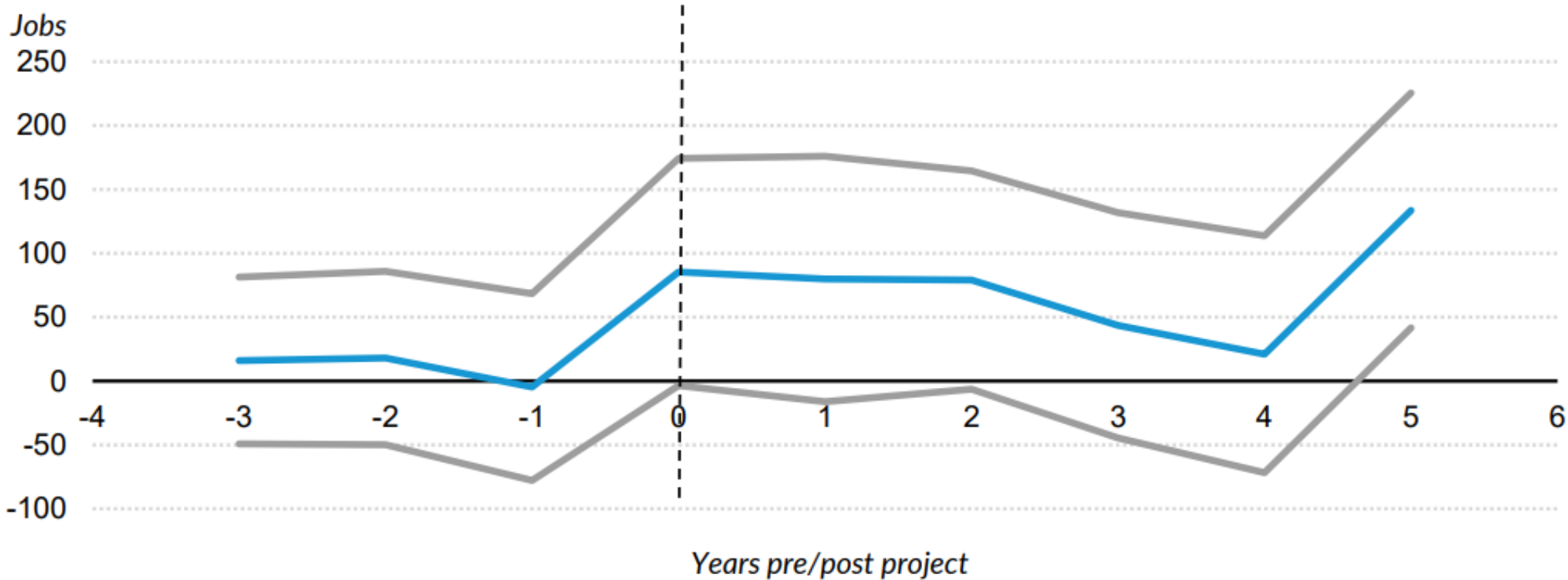
**Notes:** Firms, jobs, and poverty rate are primary outcomes (as classified in our Open Science Foundation analysis plan); Median income, population, population with a bachelor's degree, and turnover rate are secondary outcomes. "+" denotes an expected positive relationship and "-" denotes an expected negative relationship.

# Model

- **Fixed effects regression model:** Controls for unobservable differences between places that are constant over time. Includes both treated (received NMTC investment) and untreated locations
- **During and Post window:** We account for a 5-year window around the time a project is put in to accommodate for anticipatory effects and construction effects for an NMTC project. We compare three years post an NMTC project to three prior.
- **Event study:** If investors choose to invest in neighborhoods that are declining or growing differently than other neighborhoods, our estimates may pick up these pre-existing trends. We do an event study to help determine whether these pre-trends exist

# Findings

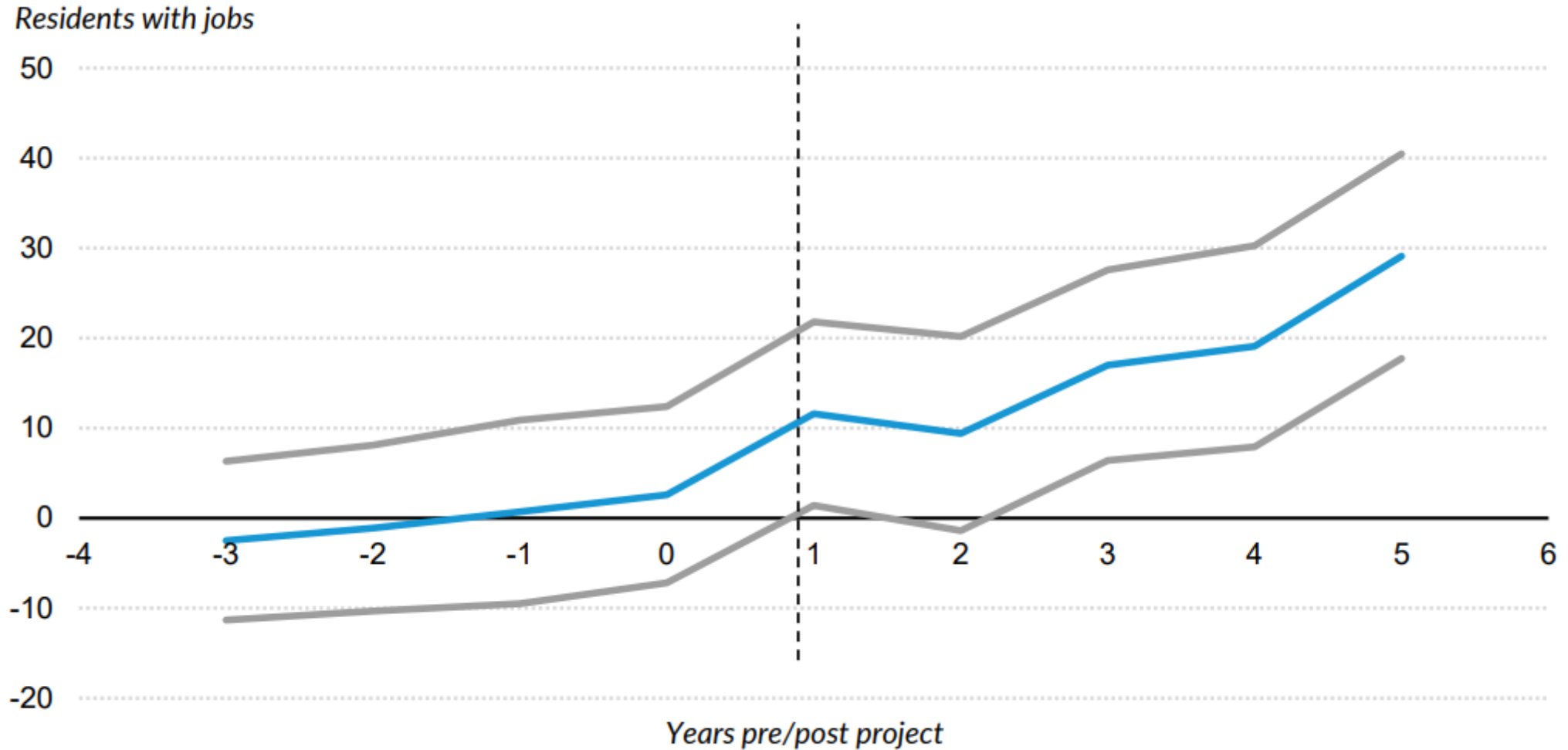
# Job Growth Before and After NMTC investment



URBAN INSTITUTE

Sources: Urban Institute Analysis of NMTC program and LEHD data.

## Number of Residents with Jobs Before and After NMTC investment



URBAN INSTITUTE

Sources: Urban Institute Analysis of NMTC program and LEHD data.



## Estimated Impact of NMTC on Firms, Jobs, Income, and Poverty

	Firms	Jobs in neighborhood	Residents with jobs	Median income	Poverty rate (out of 100)
<b>Estimated effect per NMTC project expected to affect this outcome</b>	<b>17.7***</b> (3.1)	<b>101.4**</b> (40.7)	<b>26.6***</b> (5.1)	<b>561.5***</b> (146.8)	<b>-0.65***</b> (0.099)
<b>Estimated effect of \$1 million qualified investment in projects to affect this outcome</b>	<b>1.7***</b> (0.3)	<b>6.9**</b> (3.2)	<b>2.5***</b> (0.5)	<b>55.3***</b> (14.5)	<b>-0.044***</b> (0.0092)
Average in year before NMTC project	461	5,810	1,333	34,522	30.1
<b>Years</b>	<b>2000–17</b>	<b>2004–16</b>	<b>2004–16</b>	<b>2000, 2007–16</b>	<b>2000, 2007–16</b>
Number of projects	3,164	4,575	4,476	3,090	4,154
Number of census tracts with projects	2,823	3,955	3,875	2,716	3,489
Number of eligible census tracts	32,602	32,904	32,212	32,417	32,417

Sources: Urban Institute Analysis of NMTC program, InfoUSA, LEHD, and ACS data.

**Estimated effects by  
project type: firms and  
jobs**  
Estimates of “intended”  
impacts in **bold**

	Firms	Jobs	Residents with Jobs
Retail	<b>5.2</b> (4.9)	<b>168.3**</b> (79.8)	<b>21.4*</b> (12.9)
Manufacturing and Food Processing	<b>5.5</b> (4.2)	<b>23.7</b> (105.6)	<b>-27.6*</b> (15.2)
Office and professional services	<b>28.6***</b> (8.1)	<b>40.2</b> (163.6)	<b>29.2*</b> (16.1)
Healthcare Services	<b>25.6***</b> (8.3)	<b>192.5</b> (142.4)	<b>-16.9</b> (19.9)
Schools and Childcare	<b>5.0</b> (4.9)	<b>210.6</b> (176.5)	<b>57.3***</b> (16.9)
Community Facilities	<b>7.2</b> (8.4)	<b>107.3</b> (192.2)	<b>80.5***</b> (23.5)
Services for Vulnerable Populations	<b>22.3***</b> (7.8)	<b>25.2</b> (186.3)	<b>43.1</b> (26.8)
Market Rate Residential	<b>-18.5</b> (13.5)	<b>-286.3*</b> (158.3)	<b>17.2</b> (19.3)
Hotels	<b>56.2**</b> (22.9)	<b>-11.4</b> (297.2)	<b>55.1*</b> (30.9)
Transportation and Warehousing	<b>11.8*</b> (6.9)	<b>144.0</b> (161.3)	<b>43.0</b> (47.4)
Affordable Residential	<b>11.7</b> (16.3)	<b>-262.5</b> (225.1)	<b>17.8</b> (47.2)

# Future Research And Policy

- Examine other outcomes
  - Example with LODES: using Origination-Destination files to examine where people working in areas that had NMTC investments live
- Examine if benefits make it to neighborhood residents or to people that are moving in
- Policy can incentivize project types that best align with particular community needs