Post-Secondary Employment Outcomes

Using National Jobs Data to Measure Graduate Impacts

Andrew Foote
Senior Economist, LEHD
U.S. Census Bureau

Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the U.S. Census Bureau. All results have been approved for disclosure.
What is LEHD?

- The Longitudinal Employer-Household Dynamics (LEHD) Program has constructed unique linked employer-employee data for the United States.
- It uses existing administrative data to create innovative data products and microdata for research.
- Post-Secondary Employment Outcomes (PSEO) is the most recent example of the usefulness of the data.
LEHD Public-use statistics

QUARTERLY WORKFORCE INDICATORS (QWI)
- Employment, Hires, Separations, and Wages by Worker Demographics
- Key uses:
  - Understanding the aging workforce
  - Examining hiring trends in local labor markets
  - Identifying where wages are high or where wages are growing in local labor markets

LEHD ORIGIN-DESTINATION EMPLOYMENT ESTIMATES (LODES)
- Block-level employment by where workers live and work
- Key uses:
  - Local economic development planning
  - Emergency planning
  - Business site selection

JOB-TO-JOB FLOWS (J2J)
- Hires and separations by worker origin and destination employment characteristics
- Key uses:
  - What labor markets are we losing workers to?
  - What industries are we attracting workers from?
  - Who is hiring workers from unemployment?

POST-SECONDARY EMPLOYMENT OUTCOMES (PSEO)
- New pilot statistics on earnings for college graduates by institution and major
- Key uses:
  - Estimating returns to degree
  - Short run and long run returns
  - Industries and regions graduates work
PSEO: Meeting a Data Need

There is a great deal of interest in making the economic returns to higher education more transparent.

- Institutions want to know how their graduates are doing after they leave campus
- Students want to know how much a degree could increase their earning potential, and whether or not borrowing for college is a sound investment.
- Policy makers/economic/workforce development specialists want to better understand the role of higher education in regional economic development.
Comparison with other initiatives

College Scorecard:
- Obama administration initiative to promote transparency in returns to college
- Data on earnings by institution, for enrollees who received financial aid
- **Shortcomings**: No program level data, not broken out by whether student graduated with a degree

State-level initiatives
- Lots of state higher education boards and university systems have partnered with their workforce agencies to match UI data to university records
- Publically available data from these projects vary, but many release institution or program level data
- **Shortcomings**: Earnings captured only for graduates that remain in the state, no universal methodology makes comparing earnings across programs difficult
Post-Secondary Employment Outcomes (PSEO)
A new collaboration between university systems and the Census Bureau

A joint pilot project between university systems, state longitudinal data systems, and the Census Bureau, the Post-Secondary Employment Outcomes (PSEO) are experimental tabulations providing national earnings statistics for graduates of post-secondary institutions.

Goal:
- Provide students and parents better data on the return on investment to post-secondary degrees

The PSEO provides:
- 25th, 50th, and 75th percentiles of annual earnings for college and university graduates
- Employment by industry and region of the country (scheduled for future release)
- By degree level, degree major, and post-secondary institution
- One year, five years, and 10 years after graduation.
Current Partners

Currently partnering with Census for the PSEO pilot are:

- The University of Texas System
- Colorado Department of Higher Education (all public two- and four-year institutions in Colorado)
- University of Michigan, Ann Arbor; University of Wisconsin, Madison.

Currently in talks to expand pilot to public four-year institutions and community colleges in seven states.
What about student privacy?
Protecting the Microdata

- Title 13 requirements
  - The existence of a job held by an individual is confidential
- We do not have a monopoly on microdata
- All previous statistical releases considered public knowledge
In-State Average Earnings: $80,000  National Average Earnings: $85,000
Solution: Differential Privacy

- Differential privacy guarantees that outputs from two neighboring databases (differing by one observation) not differ by a significant extent.
- Formally, it puts an upper bound on how much a person can update their priors about an individual’s characteristics.
- Conceptually, it makes an individual indifferent about whether to be in the sample or not (since the output is insensitive to their omission/inclusion).
Example of Differentially Private Protection

- Output: How many people in room are above 6 feet tall?
- True answer: 6
- Sensitivity: 1
- Noise: Laplace(1/\(\epsilon\))
- Protected Answer: 8
Implementing DP

- For the PSEO Graduate Earnings data, we construct a histogram of earnings

- Add noise to each histogram bin

- Calculate the percentiles from the noisy histogram values
Simulated Data

The bar chart represents the frequency distribution of income ranges for simulated data. The x-axis represents income ranges from $10-20K to $100-150K, while the y-axis shows the number of occurrences. The chart compares two categories: TRUE and PROTECTED, with the TRUE category shown in blue bars. The highest frequency is observed in the $80-90K range.
Simulated Data with Noise

The graph shows simulated data with noise across different income brackets. The x-axis represents income ranges ($10-20K, $20-30K, $30-40K, $40-50K, $50-60K, $60-70K, $70-80K, $80-90K, $90-100K, $100-150K), and the y-axis represents the number of occurrences. The data is categorized into two groups: TRUE and PROTECTED.
Protection Continued

- Functions of differentially private outputs retain privacy guarantee.
- We take the protected histograms, and extract percentiles from the resulting CDF.
Strengths and Shortcomings of PSEO

**Strengths:**
- *National* earnings and employment outcomes for college graduates by degree
- Uniform measurement of earnings outcomes across institutions
- Census Bureau expertise on measurement and confidentiality protection ensures high-quality statistics while protecting student privacy

**Shortcomings:**
- Privacy/information trade-offs: to maximally protect student privacy, data contain more noise than less protected tabulations
- No breakouts by gender or race (cohorts are too small)
- Earnings provided for attached workers only
Data Viz Tool Demonstration

https://lehd.ces.census.gov/data/pseo_beta_viz.html
What is next?

The initial University of Texas data release was featured in *The Chronicle of Higher Education*, *Houston Chronicle*, and *Inside Higher Ed*.

Many potential new partners have reached out to join the pilot:

- Several state longitudinal data systems, public university systems, and associations of independent colleges and private for-profit universities.

Next:

- PSEO release for the University of Michigan at Ann Arbor, and the University of Wisconsin, Madison in early 2019
- New statistics on employment by industry and region of the country (early 2019)
- Expansion of pilot to include new partners
Questions?

Email: andrew.foote@census.gov