

Center for Economic Studies Research Report: 2019

Research and Methodology Directorate

Issued June 2020



MISSION

The Center for Economic Studies partners with stakeholders within and outside the U.S. Census Bureau to improve measures of the economy and people of the United States through research and the development of innovative data products.

HISTORY

The Center for Economic Studies (CES) was established in 1982 on a foundation laid by a generation of visionaries both inside and outside the Census Bureau. CES's early mission was to house databases on businesses, link them cross-sectionally and longitudinally, conduct economic research with them, and make them available to researchers.

Pioneering CES staff and visiting academic researchers began fulfilling that vision. Using these new data, their analyses sparked a revolution of empirical work in the economics of industrial organization.

Researcher access to these restricted-access data grew with the establishment of secure research data centers, the first of which was opened by CES in Boston in 1994. Today, there are such facilities located at dozens of universities and research organizations across the country.

In time, CES expanded its focus from data and research on businesses to also include workers and households. Today, CES staff carry out empirical research on a wide array of subjects, leading to important discoveries in economics and other social sciences, improvements in existing Census Bureau surveys and data products, enhanced research databases, and new statistics and information products for public use.

ACKNOWLEDGMENTS

Randy Becker coordinated the production of this report and wrote, compiled, or edited its various parts. **John Voorheis** and **Nikolas Pharris-Ciurej** authored Chapter 2. **Andrew Foote** and **Lee Tucker** authored Chapter 3. Other CES staff contributed updates used throughout.

Linda Chen and **Faye Brock** of the Public Information Office provided publication management, graphics design and composition, and editorial review for print and electronic media. The Census Bureau's Administrative and Customer Services Division provided printing management.

DISCLAIMER

Research summaries in this report have not undergone the review accorded Census Bureau publications, and no endorsement should be inferred. Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the Census Bureau or other organizations. All results have been reviewed to ensure that no confidential information is disclosed.

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A MESSAGE FROM THE CHIEF ECONOMIST

Collaborative teamwork enables the Center for Economic Studies (CES) to conduct pathbreaking research and to develop new innovative data products. Much of the work highlighted in this annual report represents many different types of teams. Following our overview of activities at CES in Chapter 1, Chapters 2 and 3 illustrate how these partnerships lead to improved measures of our nation's economy and people and new data products. Chapter 2 provides an example of partnerships across the U.S. Census Bureau with programmatic areas in support of demographic surveys including the National Survey of College Graduates, the Current Population Survey, and the American Community Survey. Chapter 3 discusses partnerships with external stakeholders and experts in developing two new data products, the Post-Secondary Employment Outcomes (PSEO) and Veterans Employment Outcomes (VEO).

While the chapters highlight the importance of partnerships between CES and other groups, it is good to take a moment to reflect on the importance of collaborative teamwork within CES. Since these are annual research reports, it is not surprising that we focus on the work of researchers, but all CES staff contribute to our research and development activities—some directly and some indirectly. For example, in addition to the many researchers working on the Longitudinal Business Database (LBD) and its public product, the Business Dynamics Statistics (BDS), for many years the main programmer for the LBD/BDS was Ronald Davis whose code is still used throughout.

For large-scale projects that involve creating new data products, the team expands even

further from researchers and programmers. Taking the subject of Chapter 3 as an example, some of the popularity of PSEO and VEO stems



from the user-friendly tools developed to showcase the data. The development team, led by Matt Graham with Jody Hoon-Star, created tools that allow the data to be used in an intuitive fashion. The tool is hosted on our Web site managed by Heath Hayward and kept up to date by Chaoling Zheng. The data infrastructure for these products is supported by the Local Employment Dynamics partnership maintained through the efforts of Keith Bailey, Kimberly Jones, and Claudia Perez. A large part of this project requires the acquisition of external datasets for which the team works with the Economic Reimbursable Division. Finally, all of the research and data products released must go through the Census Bureau's disclosure avoidance reviews for which we rely on our work with the Disclosure Review Board.

Supporting a research office also includes researchers who take on the tasks of editing our working paper series (Christopher Goetz), coordinating our reviews (Scott Ohlmacher), running our seminar series (Emek Basker and Danielle Sandler), providing conference alerts (Bitsy Perlman), and managing our mentoring program (Randy Becker). It also requires staff who handle our budget and agreements (Cheryl Grim, Donna Myers, Towana Nix, and

(Continued)

A MESSAGE FROM THE CHIEF ECONOMIST—Con.

Sierra Noland) and administrative staff (Dawn Anderson, Rebecca Turner, and Deborah Wright). Appendix 6 of this report provides the complete listing of CES staff.

We will continue research and development activities to improve our existing data products over the coming year. We are working to produce an enhanced version of the BDS. The team working on business technology adoption continues to develop modules for use in the Annual Business Survey. Teams also continue their work on measures of productivity dispersion; business expectations and uncertainty; nonemployer statistics by demographics; income and mobility statistics;

and eligibility for and participation in the Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC). Our work to provide mortality statistics to qualified researchers on approved projects continues as usual.

Thank you to everyone who contributed to our annual report. Randy Becker compiled and edited all of the material. Editorial review was performed by Faye Brock, and design services and cover art production by Linda Chen, both of the Public Information Office. Other contributors are acknowledged on the inside cover.



Lucia S. Foster, Ph.D.
Chief Economist and
Chief of the Center for Economic Studies

Chapter 1. 2019 News

THE CENTER FOR ECONOMIC STUDIES EXPANDS ITS AREAS OF EXPERTISE

This year was our first full year with an increased focus on research and development activities. In October 2018, research staff previously with the Center for Administrative Records Research and Applications (CARRA) joined the Center for Economic Studies (CES), extending our expertise in businesses and workers to include people and households. This is also the first annual report to not discuss the activities of the Federal Statistical Research Data Center (FSRDC) network, which was founded by CES a quarter-century ago and is now administered by the new Center for Enterprise Dissemination. Likewise, the business of gathering, processing, archiving, and delivering research microdata has moved to the new Center for Optimization and Data Science. We continue to collaborate closely with these former colleagues as our missions continue to be closely entwined. Appendix 1 provides an overview of CES, and Appendix 6 lists CES staff at the close of 2019.

Our newly expanded research staff had yet another productive year in 2019, with 24 papers released in the CES Working Paper Series (see Appendix 3 for abstracts) plus another 59 papers published

(or forthcoming) as journal articles or book chapters (see Appendix 2). Some of these newly published journal articles are highlighted on the next two pages. The accompanying figure shows that CES staff research is being published in many of the top peer-reviewed journals in economics including the *American Economic Review*, *Quarterly Journal of Economics*, and *Review of Economics and Statistics*.

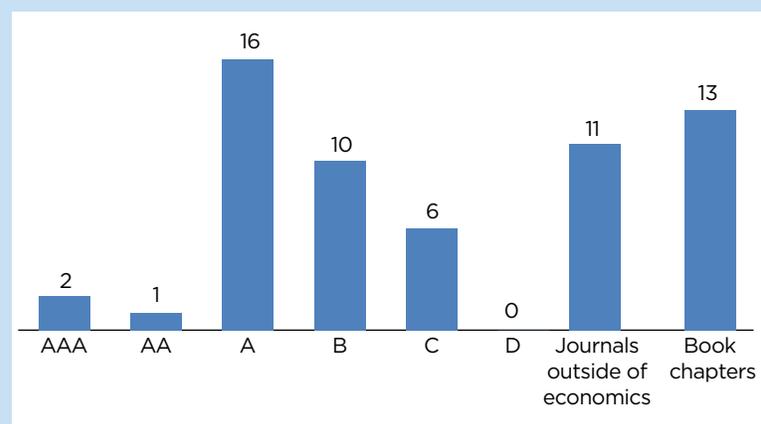
For more information about our researchers and our research, including access to papers in our working paper series (which continues to include working papers by FSRDC researchers), visit our newly redesigned Web site <www.census.gov/programs-surveys/ces.html>. Our Web site also includes links to our

public-use data products and our various analysis and visualization tools that are discussed next.

RELEASES OF PUBLIC-USE DATA

CES continued to maintain and update its public-use data products in 2019, including *Business Dynamics Statistics*, *Business Formation Statistics*, *Quarterly Workforce Indicators*, *LEHD Origin-Destination Employment Statistics*, *OnTheMap*, *OnTheMap for Emergency Management*, *Job-to-Job Flows*, *Post-Secondary Employment Outcomes*, and the *Opportunity Atlas*. In addition, 2019 saw the launch of a new, experimental statistical product: *Dispersion Statistics on Productivity*.

Figure 1-1.
**Publications by CES Staff by Journal Rank:
2019 and Forthcoming**



Note: Ranking of journals in economics is taken from Combes and Linnemer (2010), where categories (ranks) are: AAA (1-5), AA (6-20), A (21-102), B (103-258), C (259-562), and D (563-1,202).
Source: U.S. Census Bureau.

NOTABLE 2019 PUBLICATIONS BY CES STAFF

“Do Institutions Determine Economic Geography? Evidence from the Concentration of Foreign Suppliers”

Fariha Kamal and Asha Sundaram
Journal of Urban Economics
Volume 110, March 2019, pp. 89-101

Do institutions shape the geographic concentration of industrial activity? We explore this question in an international trade setting by examining the relationship between country-level institutions and patterns of spatial concentration of global sourcing. A priori, weak institutions could be associated with either dispersed or concentrated sourcing. We exploit location and transaction data on imports by U.S. firms and adapt the Ellison and Glaeser (1997) index to construct a

product-country-specific measure of supplier concentration for U.S. importers. Results show that U.S. importers source in a more spatially concentrated manner from countries with weaker contract enforcement. We find support for the idea that, where formal contract enforcement is weak, local supplier networks compensate by sharing information to facilitate matching and transactions.

“Local Labor Demand and Program Participation Dynamics: Evidence from New York SNAP Administrative Records”

Erik Scherpf and **Benjamin Cerf**
Journal of Policy Analysis and Management
Volume 38, Issue 2, Spring 2019, pp. 394-425

This study estimates the effect of local labor demand on the likelihood that Supplemental Nutrition Assistance Program (SNAP) beneficiaries are able to transition out of the program. Our data include SNAP administrative records from New York (2007 to 2012), linked at the person-level to the 2010 Census and linked at the county-month-level to industry-specific, labor market conditions. We find that local labor markets matter for the length of time spent on SNAP, but there is substantial heterogeneity in estimated effects across local industries. Using Bartik-style instruments to isolate the effect of labor demand and controlling for the changing composition of

entrants and program rules brought on by the Great Recession, we find that fluctuations in labor demand in industries with high shares of SNAP participants—especially food service and retail—change the likelihood of exiting the program. Notably, estimated industry effects vary across race and parental status, with Black participants being most sensitive to changes in local labor market conditions and mothers benefiting less from growth in local labor demand than fathers and nonparents. We confirm that our results are not driven by endogenous intercounty mobility or New York City labor markets and are robust to multiple specifications.

“Modeling Endogenous Mobility in Earnings Determination”

John M. Abowd, **Kevin L. McKinney**, and Ian M. Schmutte
Journal of Business and Economic Statistics
Volume 37, Issue 3, pp. 405-418

We evaluate the bias from endogenous job mobility in fixed-effects estimates of worker- and firm-specific earnings heterogeneity using

longitudinally linked employer-employee data from the Longitudinal Employer-Household Dynamics infrastructure file system of the

U.S. Census Bureau. First, we propose two new residual diagnostic tests of the assumption that mobility is exogenous to unmodeled determinants of earnings. Both tests reject exogenous mobility. We relax exogenous mobility by modeling the matched data as an evolving bipartite graph using a Bayesian latent-type framework. Our results suggest that allowing endogenous mobility increases the variation in earnings

explained by individual heterogeneity and reduces the proportion due to employer and match effects. To assess external validity, we match our estimates of the wage components to out-of-sample estimates of revenue per worker. The mobility-bias-corrected estimates attribute much more of the variation in revenue per worker to variation in match quality and worker quality than the uncorrected estimates.

“Race Matters: Income Shares, Income Inequality, and Income Mobility for All U.S. Races”

Randall Akee, **Maggie R. Jones**, and **Sonya R. Porter**

Demography

Volume 56, Issue 3, June 2019, pp. 999–1021

Using unique linked data, we examine income inequality and mobility across racial and ethnic groups in the United States. Our data encompass the universe of income tax filers in the United States for the period 2000–2014, matched with individual-level race and ethnicity information from multiple censuses and American Community Survey data. We document both income inequality and mobility trends over the period. We find significant stratification in terms of average incomes by racial/ethnic group and distinct differences in within-group income inequality. The groups with the highest incomes—Whites and Asians—also have the highest levels of within-group inequality and the lowest levels of within-group mobility. The reverse is true for

the lowest-income groups: Blacks, American Indians, and Hispanics have lower within-group inequality and immobility. On the other hand, low-income groups are also highly immobile in terms of overall, rather than within-group, mobility. These same groups also have a higher probability of experiencing downward mobility compared with Whites and Asians. We also find that within-group income inequality increased for all groups between 2000 and 2014, and the increase was especially large for Whites. The picture that emerges from our analysis is of a rigid income structure, with mainly Whites and Asians positioned at the top and Blacks, American Indians, and Hispanics confined to the bottom.

“What Drives Differences in Management Practices?”

Nicholas Bloom, Erik Brynjolfsson, **Lucia Foster**, Ron Jarmin, Megha Patnaik, Itay Saporta-Eksten, and John Van Reenen

American Economic Review

Volume 109, Issue 5, May 2019, pp. 1648–1683

Partnering with the U.S. Census Bureau, we implement a new survey of “structured” management practices in two waves of 35,000 manufacturing plants in 2010 and 2015. We find an enormous dispersion of management practices across plants, with 40 percent of this variation across plants within the same firm. Management practices account for more than 20 percent of the variation in productivity, a similar, or greater, percentage as that accounted for by research

and development, information and communication technologies, or human capital. We find evidence of two key drivers to improve management. The business environment, as measured by right-to-work laws, boosts incentive management practices. Learning spillovers, as measured by the arrival of large “Million Dollar Plants” in the country, increase the management scores of incumbents.

In October 2018, the U.S. Census Bureau released the 2016 **Business Dynamics Statistics** (BDS), which provides annual statistics from 1976 to 2016 on establishment openings and closings, firm startups and shut-downs, employment, job creation, and job destruction by firm (or establishment) size, age, industrial sector, state, and metropolitan area. In 2019, the *BDS* team focused its efforts on modernizing the methodology used to generate *BDS* estimates. Among the enhancements planned for the next release is a switch from the Standard Industrial Classification system to the North American Industry Classification System (NAICS). More information about the *BDS* can be found at <www.census.gov/programs-surveys/bds.html>.

In 2018, the Census Bureau launched the **Business Formation Statistics** (BFS)—an experimental public-use data series on business startups. In particular, the *BFS* provides timely, quarterly measures of new business applications and business formations. Business applications are indicated by applications for an Employer Identification Number (EIN), while business formations (actual and projected) originating from such business applications are based on the first recorded payroll tax liability for an EIN. Delays in business formation are measured by the average duration between business application and business formation. All *BFS* series are available for the United States and by state beginning with the

third quarter of 2004. With the release in October 2019, the series now extends to the third quarter of 2019.

For further details on the *BFS* and to access the latest data, visit <www.census.gov/econ/bfs/>. See Chapter 3 of our 2018 annual report for an introduction to the *BFS*.

The *BFS* is a product of CES, developed in research collaboration with economists from the Board of Governors of the Federal Reserve System, Federal Reserve Bank of Atlanta, University of Maryland, and University of Notre Dame. Started in 2012, the *BFS* is an excellent example of a successful new statistical product that relies entirely on administrative data and, therefore, creates no additional response burden on businesses.

In September, the Census Bureau and the Bureau of Labor Statistics (BLS) jointly unveiled a new set of productivity statistics on the U.S. manufacturing sector. The **Dispersion Statistics on Productivity** (DiSP) include annual measures of within-industry dispersion in productivity (i.e., output per hour and multifactor productivity) for each 4-digit NAICS manufacturing industry. The measures of dispersion include standard deviation, interquartile range (75–25), and interdecile range (90–10). This first experimental release covers 1997 through 2015.

For more details on the *DiSP* and to access the data, visit <www.census.gov/disp/>.

The *DiSP* is the product of the expertise of BLS staff in measuring productivity and that of CES staff in working with business-level microdata. The accompanying text box illustrates these data in use.

The **Quarterly Workforce Indicators** (QWI) is a set of economic indicators—including employment, job creation, earnings, worker turnover, and hires/separations—available by different levels of geography, industry, business characteristics (firm age and size), and worker demographics (age, sex, educational attainment, race, and ethnicity). In 2015, the Census Bureau first introduced the *National Quarterly Workforce Indicators*, which provide a consistent reference point for users of the state-level *QWI*. These data are available via the *LED Extraction Tool* at <<https://ledextract.ces.census.gov>>.

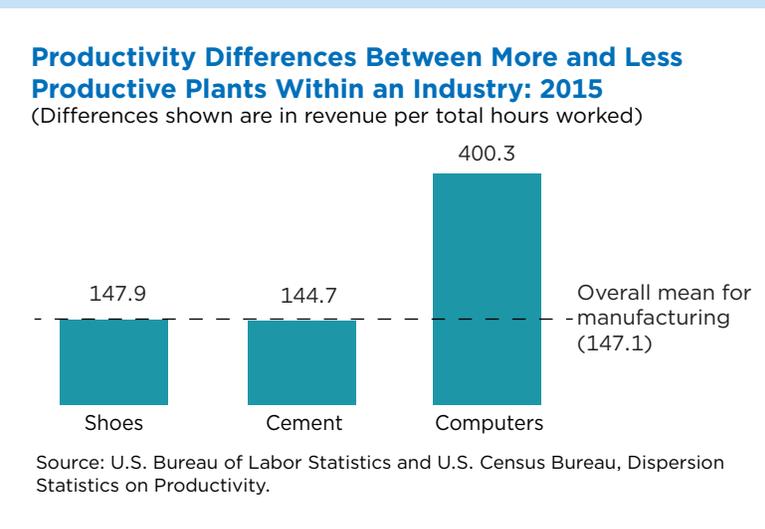
These data are also available through *QWI Explorer*, a Web-based analysis tool that enables comprehensive access to the full depth and breadth of the *QWI* data set. Through an easy-to-use dashboard interface, users can construct tables and charts to compare, rank, and aggregate indicators across time, geography, and/or firm and worker characteristics. Users can download their analyses to an Excel spreadsheet, a PNG/SVG chart image, or a PDF report, or they can share data tables and visualizations via URLs and through social media. To use *QWI Explorer*, visit <<https://qwiexplorer.ces.census.gov>>.

WHAT DRIVES PRODUCTIVITY GROWTH?

Why does one manufacturer generate more revenue per total hours worked by its employees than another manufacturer in the same industry? Take the computer equipment industry. The figure here shows that the more productive plants in that industry generate about 400 percent more real revenue per total hours worked than its less productive plants. Other industries, such as shoes and cement, have smaller differences in productivity but those differences are still large. In fact, within the average manufacturing industry in 2015, the latest year for which data are available, plants exhibit enormous differences in real revenue per total hours worked. More productive plants, at the 75th percentile of the productivity distribution, generate approximately 150 percent more real revenue per hour than less productive plants that are at the 25th percentile.

What drives these differences is an open question and one that can be explored using the Dispersion Statistics on Productivity (DiSP)—a new, experimental data product recently released by the U.S. Census Bureau and the Bureau of Labor Statistics.

The size of the productivity dispersion within an industry can tell us important information about the changing



business conditions within an industry. For example, if it becomes harder for businesses to adjust their labor force in reaction to a change in business climate, we may see a rise in dispersion. We may also see a rise in dispersion when there is a lot of experimentation and innovation within an industry. These two examples highlight that high or low dispersion is not necessarily either good or bad, but it is useful to know whether an industry has high or low dispersion. It is a way to find out information about the many factors that can lead to productivity gaps between businesses within the same industry.

There are essentially two drivers of industry-level productivity growth: (1) individual plants become more productive, and (2) more productive plants get larger by absorbing the resources of less productive

plants that are getting smaller. These two drivers are likely connected since plants that are more productive are more likely to grow. The DiSP can help us understand how large the gap is between more and less productive plants in an industry—painting a more complete picture for each industry. The measured productivity gap provides information about the potential for improvement. If there is a large gap between plants in an industry, the less productive plants have room to become more productive. They can make changes such as real-locating resources, innovating, or adopting new business practices.

To download DiSP data and for methodological details and research related to them, visit www.census.gov/disp/.

This year's releases update the base geography to TIGER 2018. They also implement an automated mechanism to identify single-quarter firm underreporting issues and impute missing worker earnings microdata records. Imputations are applied to the historical data series as well as current data.

CES staff continue to maintain and improve the **LEHD Origin-Destination Employment Statistics** (LODES) and the **OnTheMap** application. *LODES* is a partially synthetic data set that describes the geographic patterns of jobs by their employment locations and residential locations and the connections between the two locations, and *OnTheMap* is the award-winning online mapping and reporting application that utilizes *LODES* data to show where people work and where workers live. The easy-to-use interface allows the creation, viewing, printing, and downloading of workforce-related maps, profiles, and underlying data. An interactive map viewer displays workplace and residential distributions by user-defined geographies at census block-level detail. The application also provides companion reports on worker characteristics and firm characteristics, employment and residential area comparisons, worker flows, and commuting patterns. In *OnTheMap*, statistics can be generated for specific segments of the workforce, including age, earnings, sex, race, ethnicity, educational attainment, or industry groupings. One can also find firm age and firm size, allowing

analysis of the impacts of young/old firms or small/large firms in relation to commuting patterns and worker characteristics. Both *LODES* and *OnTheMap* can be used to answer a variety of questions on the spatial, economic, and demographic aspects of workplaces and home-to-work flows.

In August, version 6.7 of *OnTheMap* was released, adding an additional 2 years of *LODES* data, extending availability from 2002 through 2017. This release also updates the base geography to TIGER 2018.

OnTheMap can be accessed at <<https://onthemap.ces.census.gov>>, and *LODES* data can be directly downloaded at <<https://lehd.ces.census.gov/data/#lodes>>.

In July, version 4.4.2 of **OnTheMap for Emergency Management** (OTMEM) was released. First introduced in 2010, *OTMEM* is an online data tool that provides unique, real-time information on the population and workforce for areas affected by hurricanes, floods, wildfires, and winter storms, and for federal disaster declaration areas. Through an intuitive interface, users can easily view the location and extent of current and forecasted emergency events on a map and retrieve detailed reports containing population and labor market characteristics for these areas. These reports provide the number of affected residents by age, race, ethnicity, sex, and housing characteristics. The reports also provide the number and location

of jobs by industry, worker age, earnings, and other worker characteristics. To provide users with the latest information on rapidly changing events, *OTMEM* automatically incorporates real-time data updates from the National Weather Service, Departments of Interior and Agriculture, and the Federal Emergency Management Agency. See Chapter 2 of our 2013 annual report for a more detailed overview of *OTMEM*.

The latest release updates the American Community Survey data to the 2013–2017 5-year estimates and updates the underlying *LODES* data to 2017. *OTMEM* can be accessed at <<https://onthemap.ces.census.gov/em/>>.

Both *OnTheMap* and *OTMEM* are supported by the state partners under the Local Employment Dynamics (LED) partnership with the Census Bureau, as well as the Employment and Training Administration of the U.S. Department of Labor.

CES staff continue to update **Job-to-Job Flows** (J2J), a set of statistics on the movements of workers between jobs including information on the job-to-job transition rate, hires and separations from and to nonemployment, earnings changes due to job change, and characteristics of origin and destination jobs for workers changing jobs. These statistics are available at the national, state, and metropolitan area levels and by (origin and destination) NAICS sector, firm age and size, and worker demographic characteristics including

sex, age, education, race, and ethnicity. This year's releases incorporate data to the first quarter of 2019.

These *J2J* data files and associated documentation are available for download at <<https://lehd.ces.census.gov/data/#j2j>>.

Meanwhile, after 2 years of development and beta testing, 2019 saw the release of version 1.0 of *Job-to-Job Flows Explorer*. This interactive, Web-based analysis and visualization tool allows users to construct tables, maps, and charts to compare, aggregate, and analyze *J2J* statistics by worker and firm characteristics. The 1.0 update also provides access to metropolitan area tabulations and earnings indicators, as well as rankings and data normalization functionality.

To use *J2J Explorer*, visit <<https://j2jexplorer.ces.census.gov>>. Documentation can be found at <https://lehd.ces.census.gov/applications/help/j2j_explorer.html>.

This year also saw the further expansion and development of the experimental **Post-Secondary Employment Outcomes** (PSEO) statistics and visualization tool. First introduced in 2018, *PSEO* provides earnings and employment outcomes of post-secondary graduates, by institution, degree field, and degree level for 1, 5, and 10 years after graduation. This year, the University of Michigan–Ann Arbor and University of

Wisconsin–Madison were added, joining the University of Texas system and public institutions in Colorado. Newly introduced tabulations include the destination industry and geography of employed graduates. In November, the *PSEO Explorer* was released, providing users with an easy way to visualize graduates' earnings outcomes and employment flows. For more information about the *PSEO* and examples of its use, see Chapter 3 of this annual report.

PSEO data and documentation are available at <https://lehd.ces.census.gov/data/pseo_experimental.html>. To begin using *PSEO Explorer*, visit <https://lehd.ces.census.gov/data/pseo_explorer.html>.

A list of partners who make our *QWI*, *LODES*, *OnTheMap*, *OTMEM*, *J2J*, and *PSEO* products possible can be found in Appendix 5.

In 2018, in collaboration with researchers at Harvard University and Brown University, the Census Bureau launched the **Opportunity Atlas**, a new interactive tool providing access to highly localized data on social mobility. Using anonymized data covering nearly the entire U.S. population, the *Opportunity Atlas* contains tract-level information on children's outcomes in adulthood including income and incarceration rates by parental income, race, and gender. Visitors to <<https://opportunityatlas.org>> can explore the data through the online visualization tool, overlay their own data of interest, and download the resulting measures into a data set for their own analyses. See Chapter 2 of our 2018 annual report for a more in-depth discussion of the *Opportunity Atlas* and its potential for policymakers and researchers interested in inter-generational mobility.

THE CES DISSERTATION MENTORSHIP PROGRAM

Many graduate students use restricted-use U.S. Census Bureau microdata in the Federal Statistical Research Data Centers for their Ph.D. dissertation research, and many of these doctoral candidates are eligible to apply to the Center for Economic Studies (CES) Dissertation Mentorship Program. Program participants are assigned one or more CES researchers as mentors, who advise students on the use of Census Bureau microdata. Students are also given the opportunity to visit CES to meet with our research staff and present research in progress. This year, CES accepted two new participants into the program and, at the close of 2019, mentored 46 students from 25 different universities and a variety of different disciplines since the program began in 2008.

STATISTICAL AGENCIES COLLABORATE ON RESEARCH WORKSHOPS

BLS-CENSUS Research Workshop

On June 17, BLS and the Census Bureau cohosted their ninth annual workshop featuring empirical research by economists from both agencies. These annual workshops are intended to encourage and nurture collaboration between researchers at BLS and the Census Bureau.

William Beach, commissioner of BLS and Steven Dillingham, director of the Census Bureau provided welcoming remarks. This year's workshop consisted of three themed sessions with two papers each—one from each agency—with discussants from the other agency. In addition, a poster session of eight papers was held. Workshop papers included:

- Automation, Labor Share, and Productivity: Plant-Level Evidence From U.S. Manufacturing
- Improving Estimates of Hours Worked for U.S. Productivity Measurement

- The Role of Recruiting Intensity on Vacancy Yields: Evidence From a Large-Scale Merge of Job Postings and Survey Data
- Maternal Labor Dynamics: Participation, Earnings, and Employer Changes
- Labor Market Concentration, Earnings Inequality, and Earnings Mobility
- Megafirms and Monopsonists: Not the Same Employers, Not the Same Workers
- New Experimental State-level Labor Productivity Measures
- Analysis of Revisions to Aggregate Labor Productivity Measures
- The Gender Gap in Entrepreneurship
- Migration From Sub-National Administrative Data: Problems and Solutions With an Application to Higher Education
- Nonemployer Statistics by Demographics (NES-D): A Blended-data Approach to Demographic Business Statistics
- Driving the Gig Economy

- Job-to-Job Flows and the Consequences of Job Separations
- Opportunity Atlas

The workshop was a success thanks to the researchers from both agencies who participated and especially to Kristin Sandusky and Jim Spletzer (Census Bureau) and Sabrina Pabilonia and Elizabeth Handwerker (BLS) who organized the workshop. Planning for the tenth annual BLS-Census Research Workshop is currently underway.

LED PARTNERSHIP WORKSHOP

The 2019 Local Employment Dynamics (LED) Partnership Workshop was held at the Census Bureau on September 4 and 5. Now in its twentieth year, this workshop has been a key component in strengthening the voluntary partnership between state data agencies and the Census Bureau, leveraging existing data in the development of new sources of economic and demographic information for policymakers and data users. The workshop brings together key stakeholders including state



Steven Dillingham, director of the Census Bureau, and William Beach, commissioner of BLS, offer welcoming remarks at the ninth annual BLS-Census Research Workshop.

Labor Market Information directors, data analysts and data providers at state and federal agencies, nonprofit organizations, businesses, and other users of Longitudinal Employer-Household Dynamics (LEHD) data products. They discuss the latest product enhancements, discover how their peers are using the data, and learn about the research that will shape future improvements.

Topics addressed by presentations, panel discussions, and roundtable sessions at this year's workshop included the manufacturing sector, transportation planning, various other state and local uses of LEHD data, and making the most of published LEHD data. CES staff also discussed newly available public-use data and tools, products under development, and measurement-related research as well as



John Friedman of Brown University gave the keynote address at the 2019 LED Partnership Workshop.

offered training sessions on the J2J, OnTheMap, and the new PSEO. John Friedman, professor of economics and international affairs and public policy at Brown University, gave the workshop's keynote address on using longitudinal administrative data to

examine income inequality and social mobility.

Presentations and materials from the 2019 workshop (and those from previous years) can be found at <https://lehd.ces.census.gov/learning/#workshop>.

THE LED WEBINAR SERIES

The U.S. Census Bureau and the Local Employment Dynamics (LED) Partnership, in collaboration with the Council for Community and Economic Research, hosts an ongoing Webinar series focusing on uses of Longitudinal Employer-Household Dynamics (LEHD) data. In 2019, the following Webinars were held:

- Housing and the Tech Boom: Using LEHD and Zillow Data to Understand Housing Market Impacts (Aaron Terrazas, Zillow)
- Older People Working Longer, Earning More (James Spletzer, CES)
- Job Growth and Spatial Mismatch Between Jobs and Low-Income Residents (Reza Sardari, University of Texas at Arlington)
- Accessing the Quarterly Workforce Indicators in Census Business Builder (Andy Hait, Census Bureau)

- What Causes Labor Turnovers to Vary (Kristin McCue, CES)
- What May Be Driving Growth in the "Gig Economy?" (Kristin Sandusky, CES)
- D.C.'s Startup Scene, Part II: Opportunity Costs (Shirin Arslan, D.C. Policy Center)
- Recent Updates to LODES and OnTheMap (Matthew Graham, CES)
- Recent Updates to Job-to-Job Flows Explorer: Job Hopping Across Cities (Heath Hayward, CES)

To view recordings of these and earlier Webinars, visit <https://lehd.ces.census.gov/learning/#webinars>.

CES STAFF RECEIVE RECOGNITION

In March, Andrew Foote received a Bronze Medal Award for his work in developing and launching PSEO, a set of experimental statistics on the earnings and employment of graduates of particular postsecondary institutions. These are just the second set of statistics released by the Census Bureau to utilize

differential privacy to protect the underlying data.

At the same ceremony, Sonya Porter, Mark Leach, Benjamin Cerf, Brad Foster, Rachel Shattuck, and other team members received a Bronze Medal Award for their efforts to acquire Supplemental Nutrition Assistance Program and Women, Infants, and Children program administrative records and

develop new products using blended data. Their work led to innovative statistical products state agencies use to improve and increase efficiencies in public assistance programs.

The Bronze Medal Award for Superior Federal Service is the highest honorary recognition given by the Census Bureau.



The State Data Acquisition and Product Development Team created innovative statistical products that help state agencies improve their public assistance programs.

Chapter 2.

Improving Census Bureau Demographic Surveys Using Administrative Records

John Voorheis and Nikolas Pharris-Ciurej, Center for Economic Studies

The U.S. Census Bureau conducts dozens of household surveys covering a wide variety of topics, including housing, education, health, and expenditures. These surveys provide the backbone for measuring the people and households of the United States, providing vital information to policymakers, researchers, and other stakeholders. Conducting these surveys, however, has become increasingly challenging as response rates have declined, costs have increased, and worries about measurement error have compounded.

While no singular approach can fully reverse these trends, the use of administrative records and third-party data in the survey production process is a very promising avenue for improving survey measurement and reducing respondent burden and survey costs. Indeed, the use of administrative records is a priority not just for convenience, but because Title 13 of the U.S. Code mandates their maximum use where possible. Here, administrative records generally refer to microdata records contained in files collected and maintained by government agencies and commercial entities for the purpose of administering programs and providing services. Data acquired from commercial entities specifically are often referred to as “third party” data.

The Demographic Research Area in the Center for Economic Studies (CES) has been at the forefront of efforts to utilize administrative records, in coordination with survey production teams and subject-matter experts in the Census Bureau’s Demographic Directorate.¹ This chapter provides an overview of some of our efforts to improve survey measurement. In general, our approach involves: (1) working with survey operations staff to identify areas where administrative records could be used, (2) performing basic research on administrative records’ fitness for use, (3) prototyping potential uses for administrative records, and (4) providing support for survey operations staff to incorporate administrative records, first experimentally and then as ongoing production activities.

In this chapter, we will describe several case studies illustrating this approach. Cases fall into one of two categories. In one category, administrative records are used to enhance precollection activities through better sampling, and here we will highlight our work on the National Survey of Children’s Health. In the other category, administrative records are used to enhance postcollection activities through improvements in editing, imputation,

¹ Some of the work described in this chapter began in the Center for Administrative Records Research and Applications, which merged with the Center for Economic Studies in October 2018.

weighting, and data production. Here we will discuss our work on several surveys, including the National Survey of College Graduates, the Current Population Survey (CPS), and the American Community Survey (ACS).

USING ADMINISTRATIVE RECORDS IN SAMPLING

Most household surveys conducted by the Census Bureau use the Census Bureau’s Master Address File (MAF) as their sampling frame. However, many surveys have either a narrower target universe than all U.S. households or a need to oversample certain sociodemographic subgroups. In these cases, it is possible to use administrative records to flag households that are in these target groups and thereby improve sampling efficiency. Our work on the National Survey of Children’s Health (NSCH) is one case study of this approach.

The NSCH is a survey fielded by the Census Bureau and sponsored by the Maternal and Child Health Bureau of the Health Resources and Services Administration, a unit in the Department of Health and Human Services. The NSCH is designed to provide nationally and state-representative data on the physical and emotional health of children under the age of 18. Until 2015, the NSCH was conducted as a random-digit

dial phone survey, conducted about every 4 years by the National Center for Health Statistics. Since 2015, the Census Bureau has been the data collector, and the survey has been substantially redesigned. Most notably, after 2015 the NSCH became an address-based survey, conducted annually, and consolidating questions from the related National Survey of Children with Special Health Care Needs.

Since 2015, the NSCH has been conducted in two parts. First, sampled addresses are sent a short “screener” survey to determine if there is a child in the household. Then, households that return these screeners and have a child present are sent a more in-depth topical survey module that can be either done online or returned via a paper form.

The difficulty in conducting the NSCH as an address-based survey is mainly due to its target population. The NSCH is designed to cover only individuals under the age of 18, however only about a quarter of all households nationwide have a child. Because of this, simply sampling from the Census Bureau’s master list of all unique addresses in the United States (i.e., the MAF) is very inefficient—requiring the mailing of many screeners relative to the desired number of completed surveys. The relative scarcity of households with children is further complicated by the fact that households with children have higher-than-average rates of residential mobility. In addition, very young children are a hard-to-count population;

they are often undercounted in traditional household surveys or censuses, requiring additional efforts to accurately capture them in survey or census data collections.

In order to improve the efficiency of the NSCH sampling process, we use administrative records to assign addresses to different strata that can be sampled at different rates based on the likelihood that a child is in the household. Of course, the first and most powerful way of identifying households likely to have children is to use administrative records containing information on the location of children, which we do by combining three different data sources.

First, we use the Numident—an administrative records file sourced from the Social Security Administration that provides information on the birthplace, birthdate, and other demographic characteristics for all individuals with social security numbers—to identify all children under the age of 18 at the start of survey data collection. Second, we use a composite administrative records data set called the Census Household Composition Key (CHCK), which combines family relationship information from the Numident, IRS Form 1040 data, and the decennial census, to identify the parents of each child in the Numident. Finally, we link each child (and their parents) to the Master Address File Auxiliary Reference File (MAF-ARF) to obtain their address in the year of data collection.

The MAF-ARF is another composite administrative records file, produced annually, which combines information on addresses (MAFIDs) from multiple sources, including the National Change of Address data set from the U.S. Postal Service, IRS Form 1040s and IRS Form 1099 and W-2 information returns, Medicare enrollment data, and multiple data sets from the Department of Housing and Urban Development. After linking the Numident to the CHCK and to the MAF-ARF, we flag all addresses that have at least one child and assign them to stratum 1. We additionally retain information on the count of children at each address, by age bins that is then used for designing oversampling rates.

Although stratum 1 is a very powerful tool for identifying households with children, it is not perfect, nor does it completely identify all children. Specifically, in 2018, only about 80 percent of ACS households flagged as stratum 1 actually had a child under 18 years, and only about 70 percent of all households with children in the ACS were in stratum 1.² Therefore, relying on stratum 1 alone would be less than ideal for coverage purposes, and randomly sampling from nonstratum 1 households would present the same cost concerns that necessitated the creation of stratum 1 in the first place. To bridge this gap, we have developed a modeling and optimization approach to

² The Census Bureau Disclosure Review Board has cleared the statistics in this paper for public dissemination, DRB approval numbers CBDRB-FY2020-CES010-008, CBDRB-FY2020-CES010-001, and CBDRB-FY18-433, respectively.

allow for efficient sampling of the nonstratum 1 households while maintaining adequate coverage. Specifically, we divide the nonstratum 1 households into two substrata (2a and 2b) so that stratum 2b contains fewer than 5 percent of all children. Sampling can then proceed using only stratum 1 and 2a, which, together, contain 95 percent of all children.

To do this, we developed a statistical model that leverages data from previously mentioned administrative records (including the MAF-ARF and IRS Form 1040s), third-party data from several commercial vendors, and aggregate neighborhood (census block group) information from the ACS to predict whether a household has one or more children. This model considers whether there are women of childbearing age in the household, whether there

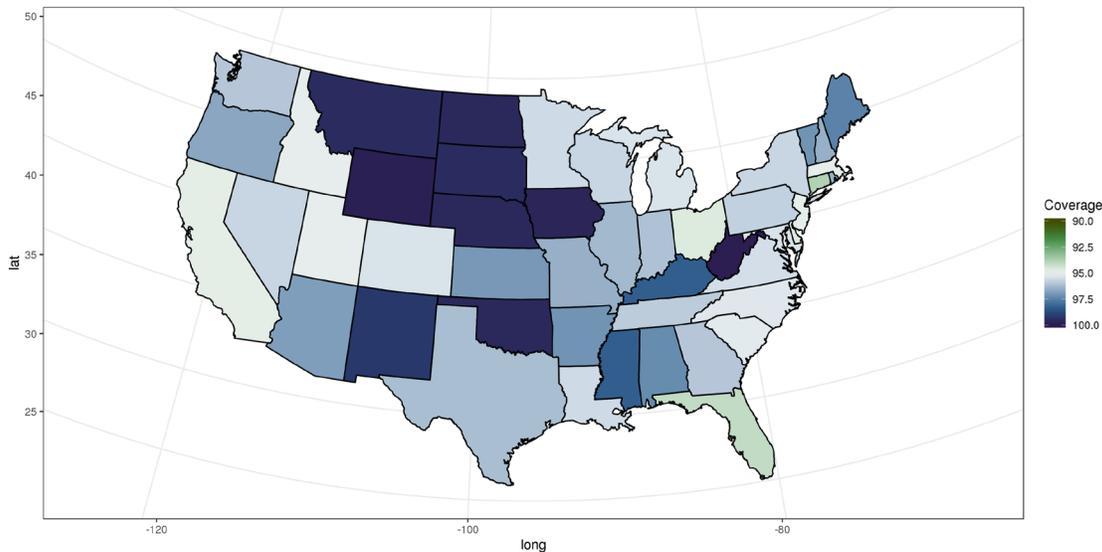
are any adults between the ages of 20 and 50, whether there are opposite-sex co-residents in the household between the ages of 20 and 50, housing tenure, number of children in the census block group, and the number of IRS Form 1040 child exemptions in the household and in the 9-digit ZIP Code. We then train this model separately for each state on the most recently available ACS microdata, augmented with information from administrative records and third-party data. We then use this model to calculate a “child-present” score for all addresses on the MAF.

Our goal is to create a stratum 2a that is as small as possible with the constraint that 95 percent of children in each state are covered by stratum 1 and 2a (or that no more than 5 percent of children are in stratum 2b). To do so, we identify the value

of the child-present score for each state that makes this true and apply these cutoff values to the entire MAF. After constructing the stratum flags, we then pass them to the NSCH survey operations team, who then design (high) sampling rates from stratum 1 and (lower) sampling rates from stratum 2a, while ignoring stratum 2b.

This sampling strategy has been quite productive, resulting in a higher proportion of successful screeners—and hence a lower number of overall screeners needed to reach the desired sample size—than otherwise would be the case. Additionally, as newer administrative records and survey data have become available, it has been possible to test the coverage of the stratum flags, to verify that the modeling and optimization step (using the slightly older data) is not systematically missing some

Figure 2-1.
Coverage Rates of the 2018 NSCH Stratum Flags



Source: U.S. Census Bureau, 2018 American Community Survey and the 2018 National Survey of Children’s Health Stratum Flags.

children. For example, Figure 2-1 summarizes the results of one such audit, comparing the coverage of the 2018 NSCH stratum flags to the 2018 ACS. Of households with children at valid (deliverable) addresses in the ACS, in most states, more than 95 percent were in stratum 1 or 2a, indicating that the stratum flags are performing in line with expectations.

Going forward, there are two key areas for further refinements to our methodology. First, postcollection analysis has suggested that, although the stratum flags have good coverage overall, they appear to cover very young children at lower rates than older children. Efforts to either improve coverage or adjust for this undercoverage are the subject of ongoing research. A second, somewhat related interest involves incorporating an even larger array of administrative records and third-party data sources into our process, such as information from state-administered social safety net programs like Supplemental Nutrition Assistance Program, as well as newly available housing data on home values, mortgages, and housing characteristics.

While we have focused here on just one survey, the essence of this approach—flagging households of interest by combining information on the characteristics of individuals with administrative records on individual residences—offers a flexible way to improve sampling for a

number of surveys. Even surveys with a broader target universe than the NSCH may benefit, as even nationally representative surveys often need to oversample certain subpopulations—a task that can be improved through the use of appropriate administrative records.

USING ADMINISTRATIVE RECORDS IN DATA VALIDATION

Besides the use of administrative records to improve survey sampling, CES staff have also applied administrative records to the task of improving surveys *post* data collection. One post-collection activity includes data quality and validation exercises. In particular, we have linked administrative records data to various surveys to understand how the two data sources align. This can be a first step toward possibly removing questions from a survey, for some or all respondents, or using the linked administrative records values in editing or imputation procedures. To take one example, we have collaborated with other Census Bureau staff on research examining the feasibility of replacing housing questions on the ACS and American Housing Survey with available third-party data.

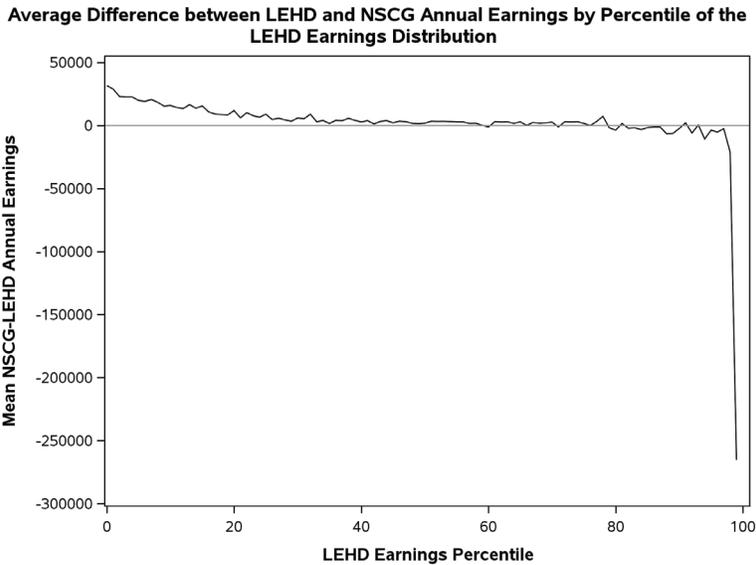
So far, most of our efforts in this area have focused on data validation work, examining a wide variety of topical areas on numerous surveys including demographic measures, educational attainment, income,

occupation, employment, and social safety net programs to name a few. An excellent example of this work is our efforts to link the National Survey of College Graduates (NSCG) and administrative records contained in the Longitudinal Employer-Household Dynamics (LEHD) files, which gives us the ability to compare NSCG responses to questions about earnings, employment, and employer characteristics, such as industry and number of employees, to values reported by employers to their states' unemployment insurance system. Our comparison of earnings across the earnings distribution reveals a striking pattern, as seen in Figure 2-2. We find that individuals with low administrative records earnings report relatively higher earnings on the survey, while individuals at the top of the income distribution report substantially lower earnings on the survey.

Related validation and alignment work is currently underway that examines income measurement in the ACS. Using an expanded set of tax information made accessible through a joint statistical project with the Internal Revenue Service (IRS), CES researchers, in collaboration with Census Bureau colleagues in the Demographic and Decennial directorates, are investigating how responses to the ACS income questions (specifically self-employment, investment income, earnings, and retirement income) compare with detailed information from tax records.

Figure 2-2.

Comparison of Earnings Reported in the NSCG and Administrative Records Earnings From LEHD



Source: U.S. Census Bureau, 2010 National Survey of College Graduates and 2011 Longitudinal Employer-Household Dynamics Snapshot.

To date, such comparisons have not been possible, and we expect that this work will yield important insights into measurement error and improvements in measurement on both sides of the comparison. This is particularly the case for surveys like the ACS, which tend to have high item nonresponse rates for questions about income. And because ACS data are used to allocate more than 675 billion dollars in state and federal funds annually, improving measurement in key survey items, such as income, can have large real-world impacts. Additionally,

there may be tax administration benefits, including better understanding the nonfiler population, as well as the aggregate reporting behavior of self-employed individuals.

USING ADMINISTRATIVE RECORDS IN WEIGHTING

Another postcollection use of administrative records and third-party data is to improve survey weights to better address nonresponse bias. Sample surveys conducted by the Census Bureau construct survey weights in order to produce estimates

that will be representative of the population of interest, such as the noninstitutionalized population in the case of the CPS or the population under the age of 18 in the previously discussed NSCH. One important input into the final weights used by most surveys is a factor to account for nonresponse, which is constructed by splitting all sampled cases into cells based on observable characteristics.

In most Census Bureau household surveys sampled from the MAF, the number of observable household characteristics is limited and, therefore, the nonresponse cells are not as detailed as they could be, potentially resulting in uncorrected nonresponse bias. However, by integrating administrative records data, it is possible to have much more information about responding and nonresponding households, allowing for more detailed nonresponse cells. We are currently working with our Census Bureau and Bureau of Labor Statistics colleagues on research to incorporate administrative records, such as income from IRS Form 1040s as well as the previously described MAF-ARF and third-party housing data, into the nonresponse adjustment factors for both the Consumer Expenditure Survey and the CPS. We expect this research will be broadly applicable to other household surveys.

USING ADMINISTRATIVE RECORDS TO CREATE NEW STATISTICS

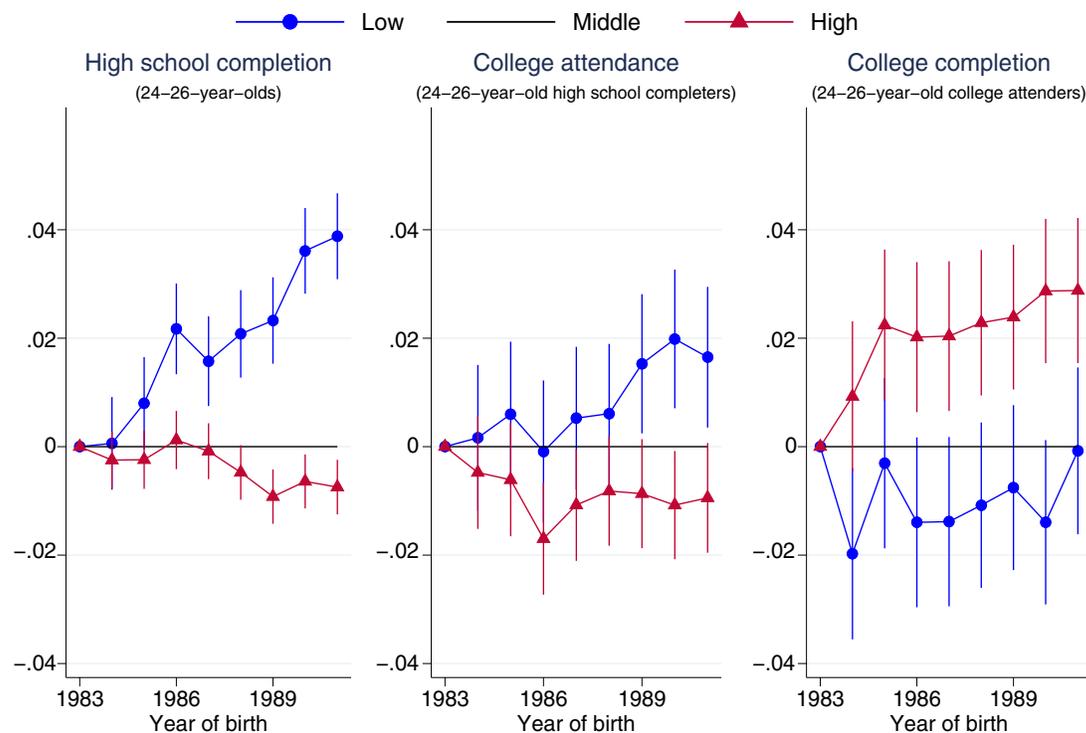
A final area of focus for CES is the production of entirely new statistics by blending data from household surveys, the decennial census, third-party data, and various administrative records sources, thereby expanding the scope of information available in any one source without increasing respondent burden or survey length. One way to construct such blended data products is to combine the rich cross-sectional information in a household survey with the extensive *longitudinal*

information available in administrative records, albeit on a more limited set of variables. One such example is a project we are conducting with the ACS Office that employs data from ACS respondents from 2006 to 2018 and the universe of IRS Form 1040 data to understand trends in educational attainment. In particular, we have linked data from 24- to 26-year-old ACS respondents to their parents' tax return information when they were in high school (i.e., when aged 16 to 18). This use of blended ACS and IRS data improves both on what can be done with just survey data (relatively few 25-year-olds live at home) and with

just administrative tax records (these can only measure college attendance but not completion). The result has been new insights into patterns of educational attainment.

Specifically, Figure 2-3 shows the high school completion, college attendance, and college completion rates for 24- to 26-year-olds whose parents were in the bottom versus top tercile of the income distribution when they were in high school. We see that high school completion and college attendance have both increased for low-income children, reducing income gaps, but the gap in college completion has actually

Figure 2-3.
Trends in Educational Attainment by Family Income in the ACS



Source: U.S. Census Bureau, 2006-2017 American Community Survey, 1998-2015 IRS Form 1040 data, and Census Numident.

widened slightly. Additional work examines how these income gradients in educational attainment vary by sociodemographic and neighborhood characteristics. This work complements both existing data products from the National Center for Education Statistics, as well as other Census Bureau blended data products, such as the Opportunity Atlas, which was highlighted in last year's annual report.

Another type of blended data product combines survey content and administrative records *at a single point in time*. An example of this that we are currently working on uses ACS and federal income tax data to produce new subnational statistics on the distribution of income. One limitation of administrative tax data is that it only provides information on income that is relevant to the tax authorities. On the other hand, household surveys, such as the ACS, provide broader definitions of income—including in-kind and cash transfers—and also allow for the study of household or family income, although there

are concerns about misreporting on surveys.

A second limitation of administrative tax data is that it only provides information for resource-sharing groups as defined by tax law. That is, an IRS tax unit, i.e., everyone appearing on a single IRS Form 1040, can differ from usual household or family concepts. For example, two cohabiting unmarried partners will not share a tax return, but they would be in the same survey household or family. By combining the best features of these two data sources, it is possible to construct a conceptually attractive blended measure of household pretax posttransfer income. With these new blended income data, we have begun to construct new statistics on the distribution of income for states and other subnational geographies.

CONCLUSION

Throughout this chapter, we have highlighted various efforts to develop new and innovative ways to incorporate administrative records into survey measurement. These efforts focus on all phases of the survey life

cycle and lead to less costly data collection, better data quality, and/or richer data, all without increasing respondent burden or even decreasing such burden.

Despite our successes, there is still much research and planning that must occur before we are able to exploit the full potential of these innovative administrative records-based approaches. We look forward to continuing our work with collaborators within the Census Bureau and across the federal government, as we incorporate administrative records into survey operations and create blended data products that provide new, timely, valuable information to the American public.

The Census Bureau is tasked with providing data on the nation's people and economy, and administrative records have proven to be an increasingly important way for us to fulfill this mission. As the Census Bureau continues to explore the full potential of administrative records, CES will continue to be at the forefront of these efforts.

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Chapter 3.

Transitions Into the Labor Force: Using the Census Bureau's National Jobs Frame to Measure College Graduates' and Veterans' Outcomes

Andrew Foote and Lee Tucker, Center for Economic Studies

Through the Local Employment Dynamics (LED) partnership with states, the District of Columbia, and U.S. territories, the U.S. Census Bureau has developed a national jobs frame and data products including the Quarterly Workforce Indicators, OnTheMap, and Job-to-Job Flows. Moreover, the unique features of this data infrastructure, based on worker-level employment and earnings data from state unemployment insurance records, have allowed researchers, both within the Census Bureau and through the Federal Research Statistical Data Center network, to study numerous important economic questions that might otherwise be unanswerable. While other large data sets permit researchers to construct limited snapshots of labor market outcomes for particular subpopulations of interest, few provide the longitudinal information needed to analyze job transitions or career trajectories, while being comprehensive enough to examine those key subpopulations.

Because of its unique advantages, these data have long been used to analyze short-term labor market trends. For example, Job-to-Job Flows allows users to easily construct detailed analyses of job transitions. Yet, there is abundant evidence that earnings upon entry into the labor market, and subsequent long-run career trajectories, are important as well. In particular,

a number of research studies have shown that the initial entry conditions of workers have long-run impacts on earnings outcomes for both college graduates and veterans (e.g., Oreopolous et al., 2012 and Zou 2018). Furthermore, some of this research has examined how career trajectories differ based on an individual's field of study or training background (Altonji et al., 2016). Until recently, Census Bureau public-use data products provided no information on these long-run outcomes. Moreover, because the demographic data contained in administrative records obtained through the LED partnership are limited, policymakers (including our LED partners) have been unable to analyze and understand the career trajectories of the groups of individuals of importance to them.

Two new public-use data products developed by Center for Economic Studies (CES) researchers fill this void of

information on long-run earnings and employment outcomes. In particular, the Post-Secondary Employment Outcomes (PSEO) contains data on the career outcomes for graduates of post-secondary institutions, while the Veterans Employment Outcomes (VEO) contains earnings outcomes for veterans who have left the armed forces. These data products are possible through new partnerships with university and military stakeholders, respectively, expanding on the Census Bureau's long history of fostering productive partnerships. Moreover, through the novel application of formal differential privacy techniques, each product is able to provide detailed information of interest to our partners, policymakers, and the general public, while also upholding our legal obligations to protect individuals' privacy. In what follows, we provide an overview of the history, goals, and techniques associated with these new data products.

The PSEO and VEO provide critical information to better understand labor market outcomes. These experimental data products resulted from new partnerships the Census Bureau has developed with colleges, universities, and the U.S. military. Importantly, the PSEO and VEO directly inform household decision making about career planning and educational investments. Moreover, these products are based entirely on existing information, requiring no additional burden on individuals. We look forward to scaling these products to cover all higher educational institutions and all branches of the armed forces.

Ron Jarmin, Deputy Director of the Census Bureau

DEVELOPING THE PSEO

Until recently, data on the employment outcomes of graduates of postsecondary institutions have had limitations. A number of states have matched data on workers in their individual state (from their state's unemployment insurance program) to data on graduates from their universities. While this provides useful information, it misses graduates who move to a different state—an issue that grows worse over a longer time horizon. Schools now have earnings outcomes at the program level (i.e., degree level and major) through the Department of Education's College Scorecard. However, the College Scorecard data are limited to graduates who received Title IV financial aid as students and only include earnings for the first year after graduation, which typically do not reflect long-run earnings outcomes.

The PSEO addresses the need for both *national* earnings and employment outcomes data and a longer time horizon. Though there are many data sources containing college graduate outcomes, PSEO is the only source that contains *all* graduates of a postsecondary institution. The PSEO also calculates consistent earnings outcomes across majors and institutions, enabling direct comparisons.

The PSEO began as a partnership with the University of Texas (UT) System. The Census Bureau benefited from the expertise of UT staff who had previously developed a similar set of measures and who could help us to understand how students and administrators interact with such

data. Their input also enabled us to choose the most consistent measure of earnings, the appropriate levels of aggregation, and the acceptable level of “noise” to infuse into estimates (to protect privacy). Our partners also helped us develop the original PSEO data visualization tool.

The UT System has been one of the main public advocates for PSEO and has generated much publicity and visibility for this useful product. Their advocacy and support for the broader Census Bureau effort helped expand this partnership to other states.

THE PSEO IN ACTION

The PSEO consists of two sets of tables about graduates. The first set provides statistics on earnings by postsecondary institution, degree level, degree field, and graduation cohort at 1, 5, and 10 years after graduation.

Here earnings for the 25th, 50th, and 75th percentiles of each cell as well as higher-level aggregations are reported. These data are useful for assessing the initial earnings of graduates, comparing different types of degrees, and examining the earnings trajectory of degrees over time.

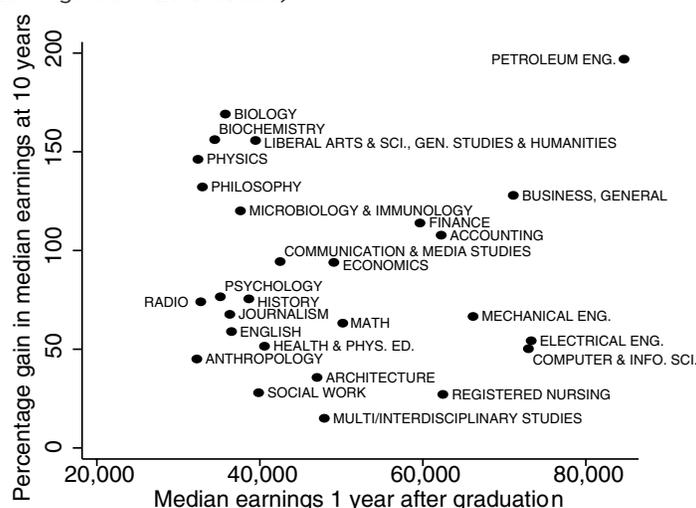
The second set of PSEO statistics are the employment flows table, which show census division and industry sector of a graduate's main job at 1, 5, and 10 years after graduation. These tabulations allow users to see where graduates work immediately following graduation as well as their employment in the middle of their careers.

As noted above, an advantage of the PSEO over similar data is its ability to compare longer-run earnings outcomes across fields of study. Figure 3-1 shows the median earnings at 1 and 10

Figure 3-1.

Initial Earnings and 10-Year Earnings Growth for 2001–2003 University of Texas at Austin Graduates by Degree Field

(Earnings are in 2016 dollars)



Source: U.S. Census Bureau, Post-Secondary Employment Outcomes.

years after graduation for select graduates from the University of Texas at Austin. While graduates in a number of fields earn around \$40,000 in their first year, subsequent earnings growth varies from less than 25 percent to almost 200 percent. For example, biology and biochemistry majors in their tenth year earn over 150 percent more than what they earned in their first year, while the earnings of social work and anthropology graduates grew less than 50 percent over the same period. Meanwhile, registered nursing graduates have very high median earnings (over \$60,000) in their first year, but very low earnings

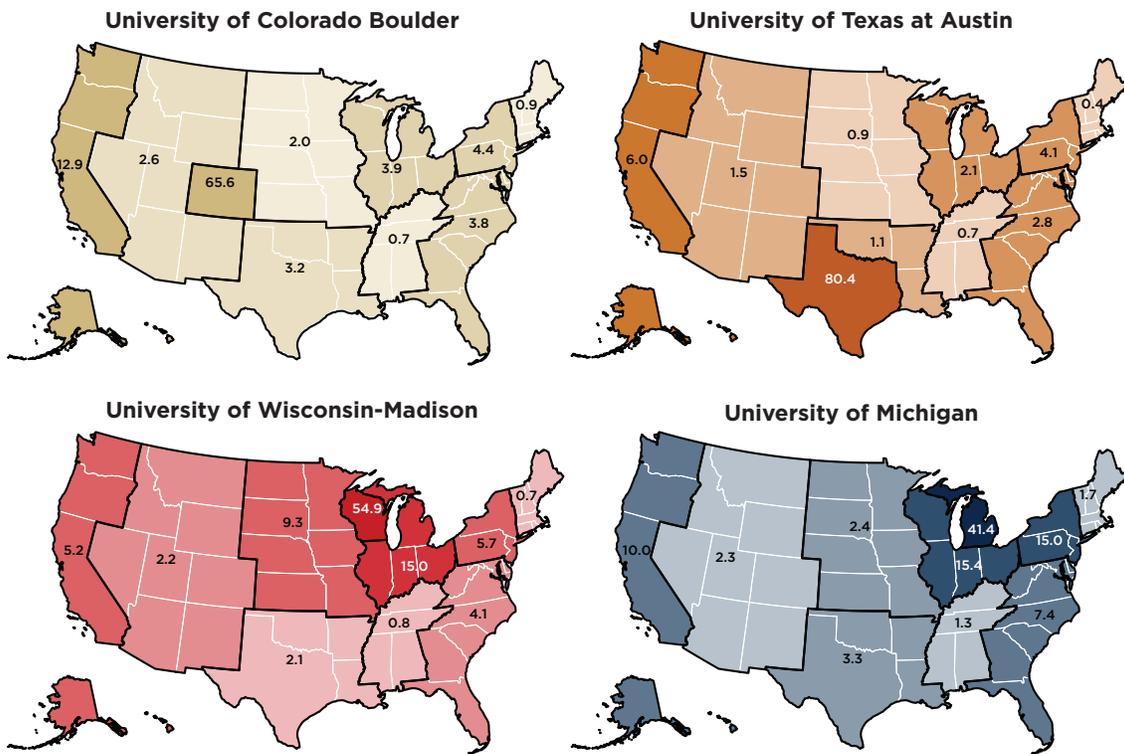
growth—on par with social work. Thus, when making decisions about borrowing against future income, information on long-run earnings is much more relevant than first-year earnings.

For state policymakers, a primary interest is the retention of university graduates within the state, which depends on the match between employment opportunities and training. The PSEO employment flows data sheds light on the job mobility of graduates over time.

Figure 3-2 shows where graduates work 1 year after graduating from the four flagship institutions currently in the PSEO data.

There are some large differences across these schools. In particular, graduates from the University of Texas at Austin are much more likely to stay in Texas (80.4 percent), while University of Michigan Ann Arbor graduates are much more likely to leave Michigan (58.6 percent). Besides out-of-state mobility rates, there are also significant differences in regional destinations. For example, while both schools are in the Midwest, University of Michigan Ann Arbor graduates are almost twice as likely to be employed in the Pacific Division as University of Wisconsin Madison graduates, while they have similar rates of remaining in the Midwest.

Figure 3-2.
Where Graduates With a Bachelor’s Degree From Four Flagship Institutions Work by Region
 (In percent)



Source: U.S. Census Bureau, Post-Secondary Employment Outcomes.

The PSEO employment flows data also sheds light on the industry of employment and how those employment patterns differ by field of study and institution. Figure 3-3 compares the relative flow of graduates into different industry sectors for three of the most popular bachelor degree fields: business, social sciences, and communications. Not surprisingly, a large proportion of business graduates become employed in the finance and insurance sector, while comparatively few go into education. Meanwhile, social science majors are much more likely to be employed in the health and education sectors than in other sectors of the economy. These examples illustrate the PSEO's utility for understanding the transition of college graduates into the labor market, filling a void that had existed in available data.

To learn more about the PSEO and to download data, visit https://lehd.ces.census.gov/data/pseo_experimental.html, or use the PSEO Explorer visualization tool at https://lehd.ces.census.gov/data/pseo_explorer.html.

VEO AND THE CAREER TRAJECTORIES OF VETERANS

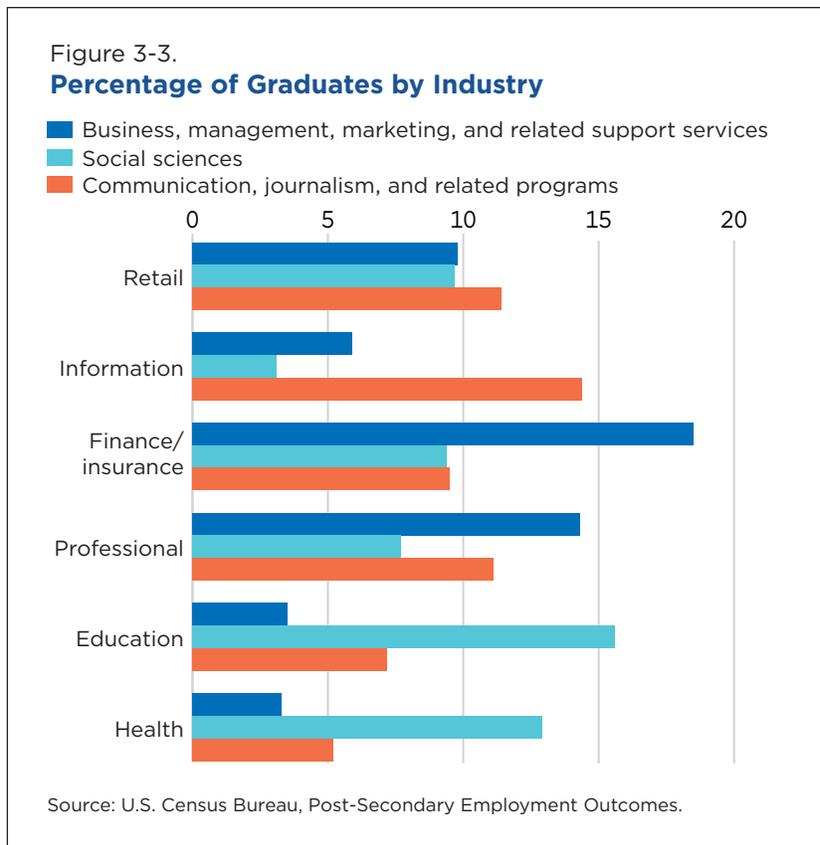
With the successful launch of the PSEO, it was natural to envision other, similar data products. Much like higher education, military service often occurs before entering the labor market, and it also has the potential to impact labor market outcomes in the long run. An understanding of these outcomes for

veterans is not only of interest to the military, but also to other policymakers and to individuals themselves. As with the PSEO, the VEO began when CES found an outside data provider—in this case, the Office of Economic and Manpower Analysis of the U.S. Army—who was interested in partnering with us to create new and useful information. CES staff received information on the set of individuals who served in the U.S. Army at any time from 1990 through 2017. These Army data include enlistment and separation dates, a wide range of demographic information, and various characteristics of military service. This information was combined with worker-level employment and earnings data to create the VEO, covering all

enlisted veterans who completed their initial term of service and then separated from active duty military service in the years 2000–2015.

Similar to the PSEO, the VEO reports industry of employment and earnings percentiles for military veterans 1, 5, and 10 years after they leave active duty service. In addition, VEO is able to report statistics by a wide range of demographics and characteristics of military service, including age, sex, race and ethnicity, military occupation, rank, years of military service, education at enlistment, and Armed Forces Qualifying Test scores.

One of the many useful features of the VEO is the ability to observe the career trajectories



and earnings dispersion of veterans based on their military occupation. Among other uses, this can provide potentially valuable information to incoming service members who are considering what occupations to choose. Figure 3-4 shows veterans' median earnings trajectories for certain military occupations, including large, general occupations such as infantry and smaller, more technical occupations. Figure 3-5 shows earnings dispersion at 5 years after discharge for the same set of occupations. These tables reveal that the military occupations that lead to higher long-term civilian earnings also have more uncertainty in those earnings.

Another useful feature of the VEO is the ability to look at time trends in employment

and earnings by using short, repeated cohorts. For example, Figure 3-6 shows median annual earnings in the first year after discharge by educational attainment at enlistment. Interestingly, earnings for individuals with at least a high school diploma at enlistment increased during the 2007–2009 Great Recession and declined thereafter. This may be a result of fewer service members opting to leave the military during this period, in order to avoid a recessionary labor market (Borgschulte and Martorell, 2018).

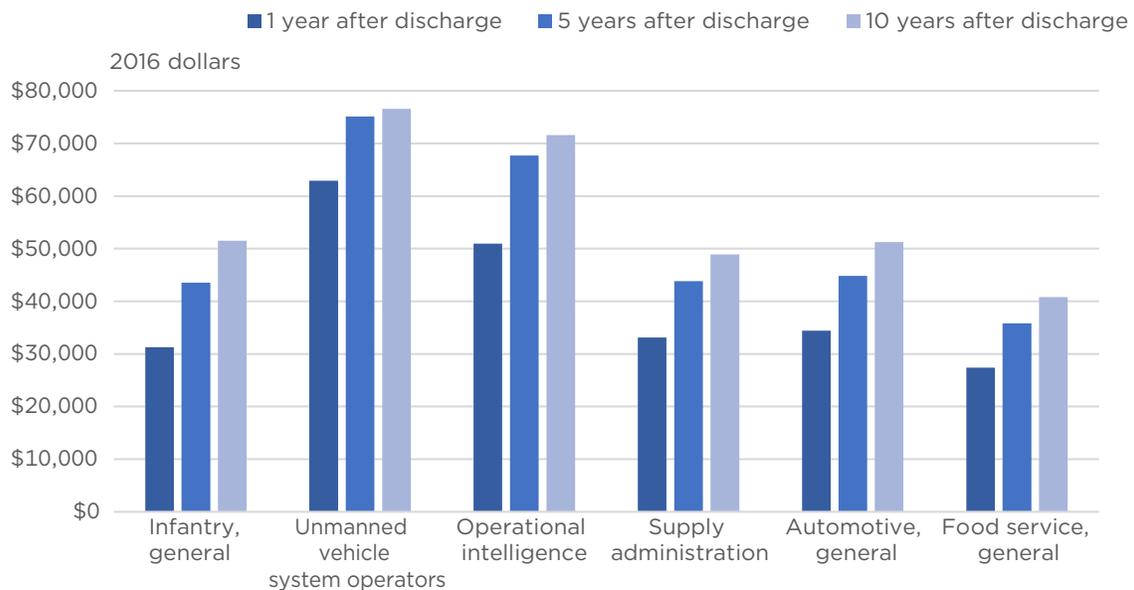
All of these examples and many others can be produced using the VEO Explorer visualization tool at <https://lehd.ces.census.gov/applications/veo/occupation/detail/>, and downloadable files and

documentation are available at https://lehd.ces.census.gov/data/veo_experimental.html.

FUTURE DIRECTIONS

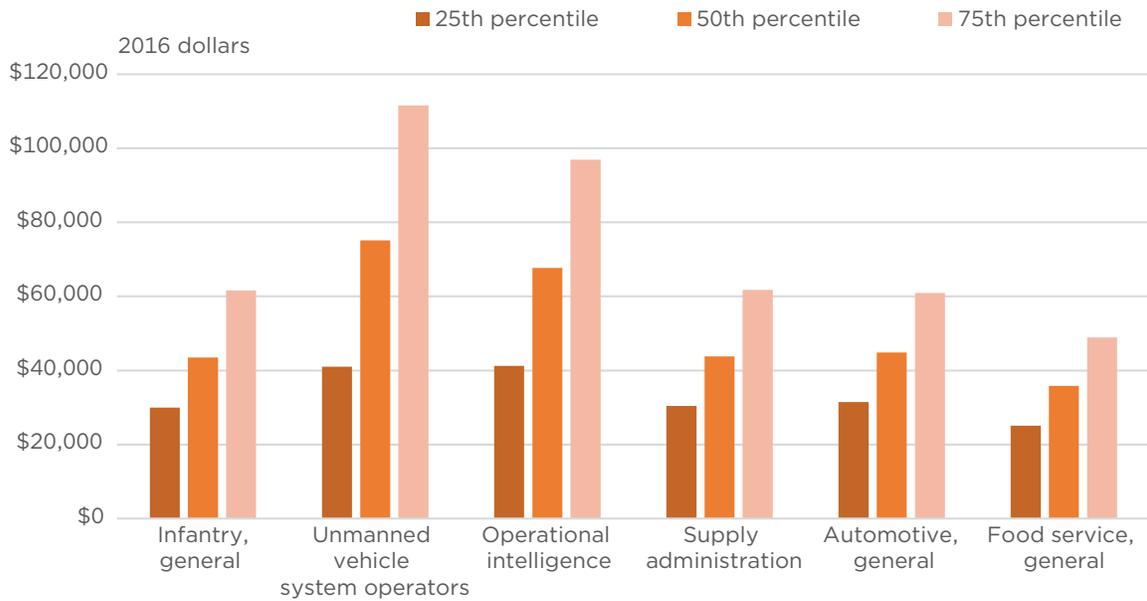
We hope to both broaden and deepen the PSEO data products. In terms of broadening the PSEO, new universities continue to join the partnership with a goal of increasing coverage to around 25 percent of all post-secondary graduates by 2021. In terms of deepening the PSEO, the microdata underlying the PSEO are also being used for important research projects, such as measuring the bias in earnings when only using in-state earnings, as well as comparing the administrative data on field of study and level of education with survey responses from within the Census Bureau.

Figure 3-4.
Median Annual Earnings for Army Veterans 1, 5, and 10 Years After Discharge by Occupation



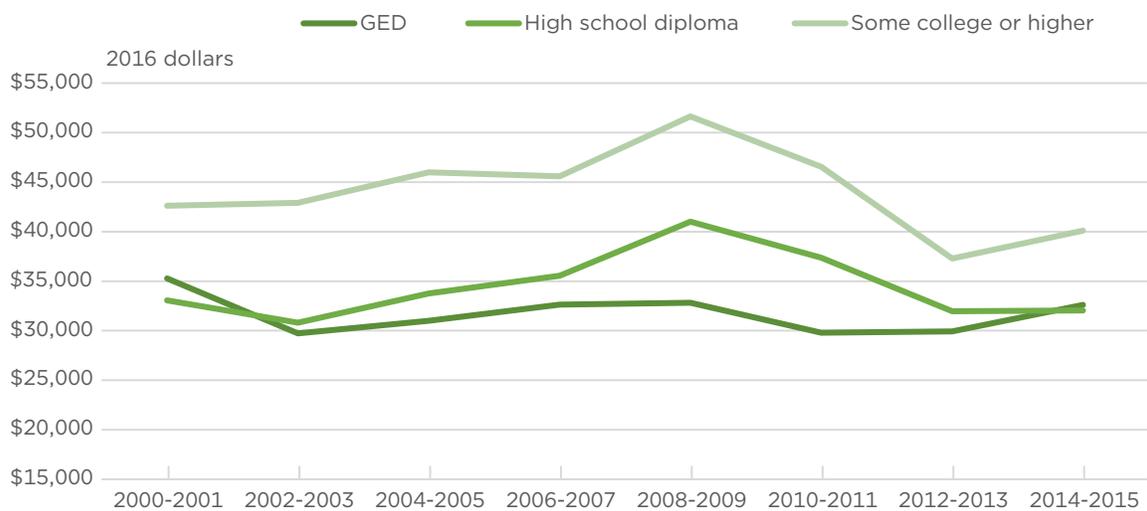
Source: U.S. Census Bureau, Veterans Employment Outcomes, 2000–2007 cohort.

Figure 3-5.
Dispersion in Annual Earnings for Army Veterans 5 Years After Discharge by Occupation



Source: U.S. Census Bureau, Veterans Employment Outcomes, 2000-2007 cohort.

Figure 3-6.
Median Annual Earnings for Army Veterans 1 Year After Discharge by Educational Attainment at Enlistment



Source: U.S. Census Bureau, Veterans Employment Outcomes.

We are also using PSEO as a pilot for incorporating Internal Revenue Service earnings data into the LED data infrastructure, as a secondary source of earnings and employment information.

We are also investigating opportunities to expand the VEO and analyzing its potential for research that improves our understanding of labor market outcomes for military veterans, including veterans from other

branches of the armed forces. As we continue our research and development efforts, we expect new partnerships that will yield similarly valuable data products.

PSEO AND VEO: THE PRIVACY CHALLENGES AND SOLUTIONS

The rise of administrative data sources and their use by statistical agencies, as well as data partnerships, have led to a proliferation of new and valuable information on the population and the economy. However, it has also created many new challenges for statistical agencies, which have a legal obligation to ensure individual privacy. Increasingly, statistical agencies must face the reality that outside entities have access to large portions of the data underlying their public-use outputs. When partnering with an outside data provider, such as in the cases of PSEO and VEO, this is obviously explicitly true. The Census Bureau must always ensure that the statistics it publishes are robust to any outside attempts to combine those statistics with external data to identify the existence or attributes of any given individual. Many of the traditional privacy protection measures employed by statistical agencies are not well-suited to this particular challenge because they were developed for survey-based statistics, where only the statistical agency possesses the underlying microdata.

To address these new privacy challenges, the Census Bureau has become a leader in the application of “differential privacy” techniques. At their core, these techniques allow the Census Bureau to quantify the worst-case loss to individual-level privacy associated with each statistic that it releases and therefore formally (in a mathematical sense) guarantee that the risk of privacy loss is appropriately limited. While PSEO and VEO are not the first Census Bureau data products to employ differential privacy methods, they provide a clear demonstration of how the innovative use of differential privacy enables the production and release

of public-use data that might otherwise have been impossible without sacrificing individual privacy.

The specific issue with both PSEO and VEO is that the partners who provide us the data have access to the complete frame of individuals—graduates and veterans, respectively—that is used to produce our statistics. In the case of PSEO, our partners also observe earnings for the subset of graduates employed within the state. So, in the worst case, where just one graduate is employed outside the state, the earnings of an individual graduate could be inferred from a single aggregate statistic such as median earnings. Meanwhile, detailed tabulations by, say, college major are especially difficult to protect using traditional statistical disclosure limitation methods because outside data users can create implicit samples that threaten the privacy of individuals in the microdata. Yet these tabulations are also of particular interest to our partners and to the general public.

One solution is to add sufficient “noise” to the underlying statistic so that it is more difficult to identify any one individual, no matter what information the end user has. However, any introduction of noise comes with an inevitable trade-off in the accuracy of the information that is released. The differential privacy techniques applied to both the PSEO and VEO have allowed us to quantify this trade-off and therefore maximize our ability to release useful statistics without creating unacceptable risks to individual privacy.

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Continue from page 27...

A major contribution of both the PSEO and VEO is that they provide earnings percentiles for many subsets of college graduates and veterans, respectively. Earnings percentiles are typically difficult to publish because true percentiles correspond to specific individuals. Previous methods for releasing percentiles using differential privacy produced estimates that were too noisy to be useful in this setting. In a key methodological innovation, the PSEO team first used public information about the earnings distribution to construct a histogram of earnings and then added geometric noise to the counts associated with each bin in the histogram. This approach has two advantages over previous methods. First, the use of public information permitted more accurate ranges on the possible values for the earnings percentile. Second, the method injects noise across the entire histogram, allowing the release of multiple percentiles while only incurring one instance of privacy loss. See Foote et al. (2019) for more detail and for comparisons to other methodologies. The code is posted on GitHub for use by other statistical agencies. Given the dearth of off-the-shelf implementations of differential privacy, we hope that providing these resources is helpful to others seeking to implement formal privacy protections.

The VEO also utilizes the above code and built on the innovations from the PSEO by addressing another significant challenge. Differential privacy methods, such as the histogram method, incur a privacy loss for each tabulation that is produced, while the overall loss to privacy is not permitted to exceed a threshold “budget” beyond which the privacy loss is considered unacceptable. The VEO team wished to provide statistics on earning percentiles across several demographic and economic dimensions such as occupation, industry, and geography. This meant that, in addition to limiting the overall loss to privacy, the project team needed to balance the trade-off between privacy loss and statistical accuracy for each individual table and efficiently allocate its privacy budget across the numerous desired tables. To accomplish this, the team first developed new metrics to quantify the accuracy of privacy-protected data that could be compared across tables. Then, in keeping with the research of Abowd and Schmutte (2019), the team built an optimization method that determined which combination of individual table budgets would ensure desired minimum accuracy for each table without exceeding the overall privacy loss budget and without having to omit detailed tabulations that might be of benefit to users. Besides the VEO, this method is useful for any similar product that involves multiple tables.

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Appendix 1.

OVERVIEW OF THE CENTER FOR ECONOMIC STUDIES

The Center for Economic Studies (CES) partners with stakeholders within and outside the U.S. Census Bureau to improve measures of the economy and people of the United States through research and the development of innovative data products.

RESEARCH

CES research staff use confidential microdata from Census Bureau censuses and surveys of businesses and households, linked employer-employee data, and administrative records from federal and state agencies and other sources to carry out empirical research that leads to:

- Discoveries in economics and other social sciences not possible using publicly available data.
- Improvements in existing Census Bureau surveys and data products.
- Enhancements to micro-level data sets for researcher-use in the Federal Statistical Research Data Center (FSRDC) network.
- New statistics and information products for public use.

Research findings are disseminated through publications (see Appendix 2), CES working papers (see Appendixes 3 and 4), conferences, seminars, workshops, and this annual report.

PRODUCTS

CES uses microdata from existing censuses and surveys, and from administrative sources, to create innovative public-use data products, including:

- *Business Dynamics Statistics (BDS)*. Tabulations of establishment openings and closings, firm startups and shutdowns, and job creation and destruction with unique information on firm age and firm size.
- *Business Formation Statistics (BFS)*. Quarterly statistics on business applications and formations including projections for recent and future quarters.
- *Dispersion Statistics on Productivity (DiSP)*. Annual statistics on within-industry dispersion of productivity for the manufacturing sector.
- *Job-to-Job Flows (J2J)*. Statistics on worker reallocation, including job change, hires and separations from and to nonemployment, and characteristics of origin and destination jobs.
- *National Longitudinal Mortality Study (NLMS)*. Database for studying the effects of demographic and socioeconomic characteristics on differential in mortality rates.
- *OnTheMap*. Online mapping and reporting application showing where people work and workers live, with information on worker and business characteristics.
- *OnTheMap for Emergency Management*. Intuitive Web-based interface for accessing U.S. population and workforce statistics, in real time, for areas being affected by natural disasters.
- *Opportunity Atlas*. Interactive mapping tool showing measures of social mobility for every Census tract in the United States.
- *Post-Secondary Employment Outcomes (PSEO)*. Statistics on the earnings and employment outcomes for college graduates by institution, degree field, and degree level.
- *Quarterly Workforce Indicators (QWI)*. Workforce statistics, including employment, earnings, job creation, and turnover, by demography, geography, and industry for each state.
- *Synthetic Longitudinal Business Database (SynLBD)*. Experimental synthetic microdata on all U.S. establishments including employment, payroll, and age.

HISTORY

CES was established in 1982 to house databases on businesses, link them cross-sectionally and longitudinally, conduct economic research with them, and make them available to researchers. In his 1991 Nobel Prize lecture, economist Ronald Coase noted, “We can also hope to learn much more in the future from the studies of the activities of firms which have recently been initiated by the Center for Economic Studies of the Bureau of the Census of the United States.”

Elaborating on these thoughts in a letter sent to CES following a visit there in June 1993, Coase states:

“It must be a matter of pride for all in the Bureau of the Census to have a unit which, through its research activities, is playing such a valuable role in increasing our understanding of the working of our economic system. Of course, no individual or institution can do everything. The Center will have to depend on research conducted elsewhere (particularly in universities) . . . to develop a more complete and more accurate picture of the structure of the economy. For this reason I greatly welcome the initiative of the Bureau of the Census in establishing an office of the Center in Boston . . . and I hope, after assessing your experience in Boston, that it will be found desirable to establish similar offices in other places.”

Indeed, CES opened the first research data center in Boston in 1994 and continued to grow the network over the next quarter century. Today, there are FSRDCs located at dozens of universities

and research organizations across the country. In addition to restricted-use data on businesses and households from the Census Bureau, the FSRDCs now also provide secure access to restricted-use data from other federal statistical agencies. As of 2018, the FSRDCs are administered by the newly established Center for Enterprise Dissemination.

With time, CES’ focus evolved from a near-exclusive focus on the manufacturing sector to include nonmanufacturing sectors and data on workers and households. In 2008, the Longitudinal Employer-Household Dynamics (LEHD) program joined CES from the Census Bureau’s Demographic Directorate, and in 2018, researchers from the former Center for Administrative Records Research and Applications (CARRA) joined CES.

Today, CES is comprised of several dozen researchers with doctorates in economics, sociology, demography, public policy, statistics, and history and with research that is even more diverse.

PARTNERSHIPS

CES relies on many partners within and outside the Census Bureau, including:

- Census Bureau divisions that collect, process, and produce the business and household microdata at the heart of our research and that provide us their expert knowledge of the methodologies underlying those surveys and censuses.
- Our colleagues in other centers within the Research and Methodology Directorate.

- Those with whom we are collaborating on joint research and development including:
 - Fellow statistical agencies including the Bureau of Economic Analysis, Bureau of Justice Statistics, Bureau of Labor Statistics, Economic Research Service, and National Center for Science and Engineering Statistics.
 - Other federal agencies including the Agency for Healthcare Research and Quality, the Food and Nutrition Service, and the Small Business Administration.
 - Academic institutions including Brown University, Harvard University, University of California—Irvine, University of Maryland, and University of North Carolina at Chapel Hill.
 - Other research organizations including the Institute for Research on Innovation and Science, NORC at the University of Chicago, and the RAND Corporation.

- The members of the Local Employment Dynamics Partnership and other LEHD partners (see Appendix 5), who provide data critical to a number of our public-use data products, including *J2J*, *OnTheMap*, *PSEO*, and the *QWI*.

Appendix 2.

PUBLICATIONS AND WORKING PAPERS BY CENTER FOR ECONOMIC STUDIES STAFF: 2019

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Appendix 3.

ABSTRACTS OF CENTER FOR ECONOMIC STUDIES WORKING PAPERS BY CENSUS BUREAU STAFF: 2019

Center for Economic Studies Working Paper 19-01

NONEMPLOYER STATISTICS BY DEMOGRAPHICS (NES-D): USING ADMINISTRATIVE AND CENSUS RECORDS DATA IN BUSINESS STATISTICS

Adela Luque
Renuka Bhaskar
James Noon
Kevin Rinz
Victoria Udalova

January 2019

The quinquennial Survey of Business Owners, or SBO, provided the only comprehensive source of information in the United States on employer and nonemployer businesses by the sex, race, ethnicity, and veteran status of the business owners. The annual Nonemployer Statistics series (NES) provides establishment counts and receipts for nonemployers but contains no demographic information on the business owners. With the transition of the employer component of the SBO to the Annual Business Survey, the Nonemployer Statistics by Demographics series, or NES-D, represents the continuation of demographics estimates for nonemployer businesses. NES-D will leverage existing administrative and census records to assign demographic characteristics to the universe of approximately 24 million nonemployer businesses (as of 2015). Demographic characteristics include key demographics measured by the SBO (sex, race, Hispanic origin, and veteran status) as well as other demographics (age, place of birth, and citizenship status) collected but not imputed by the SBO if missing. A spectrum of administrative and census data sources will provide the nonemployer universe and demographics information. Specifically, the nonemployer universe originates in the Business Register; the Census Numident will provide sex, age, place of birth, and citizenship status; race and Hispanic origin information will be obtained from multiple years of the decennial census and the American Community Survey; and the

Department of Veteran Affairs will provide administrative records data on veteran status.

The use of blended data in this manner will make possible the production of NES-D, an annual series that will become the only source of detailed and comprehensive statistics on the scope, nature, and activities of U.S. businesses with no paid employment by the demographic characteristics of the business owner. Using the 2015 vintage of nonemployers, initial results indicate that demographic information is available for the overwhelming majority of the universe of nonemployers. For instance, information on sex, age, place of birth, and citizenship status is available for over 95 percent of the 24 million nonemployers, while race and Hispanic origin are available for about 90 percent of them. These results exclude owners of C-corporations, which represent only 2 percent of nonemployer firms. Among other things, future work will entail imputation of missing demographics information (including that of C-corporations), testing the longitudinal consistency of the estimates, and expanding the set of characteristics beyond the demographics mentioned above. Without added respondent burden and at lower imputation rates and costs, NES-D will meet the needs of stakeholders, as well as the economy as a whole, by providing reliable estimates at a higher frequency (annual vs. every 5 years) and with a more timely dissemination schedule than the SBO.

Center for Economic Studies Working Paper 19-03

WHY ARE EMPLOYER-SPONSORED HEALTH INSURANCE PREMIUMS HIGHER IN THE PUBLIC SECTOR THAN IN THE PRIVATE SECTOR?

Alice M. Zawacki
Jessica P. Vistnes
Thomas C. Buchmueller

February 2019

In this article, we examine the factors explaining differences in public and private sector health insurance premiums for enrollees with single coverage. We use data from the 2000 and 2014 Medical Expenditure Panel Survey-Insurance Component, along with decomposition methods, to explore the relative explanatory importance of plan features and benefit generosity, such as deductibles and other forms of cost sharing, basic employee characteristics (e.g., age, gender, and education), and unionization. While there was little

difference in public and private sector premiums in 2000, by 2014, public premiums had exceeded private premiums by 14 to 19 percent. We find that differences in plan characteristics played a substantial role in explaining premium differences in 2014, but they were not the only or even the most important factor. Differences in worker age, gender, marital status, and educational attainment were also important factors, as was workforce unionization.

Center for Economic Studies Working Paper 19-05

**DO INSTITUTIONS DETERMINE ECONOMIC GEOGRAPHY?
EVIDENCE FROM THE CONCENTRATION OF FOREIGN SUPPLIERS**

Fariha Kamal
Asha Sundaram

February 2019

Do institutions shape the geographic concentration of industrial activity? We explore this question in an international trade setting by examining the relationship between country-level institutions and patterns of spatial concentration of global sourcing. A priori, weak institutions could be associated with either dispersed or concentrated sourcing. We exploit location and transaction data on imports by U.S. firms and adapt the Ellison and Glaeser (1997) index to construct a

product-country-specific measure of supplier concentration for U.S. importers. Results show that U.S. importers source in a more spatially concentrated manner from countries with weaker contract enforcement. We find support for the idea that, where formal contract enforcement is weak, local supplier networks compensate by sharing information to facilitate matching and transactions.

IMMIGRANT ENTREPRENEURS AND INNOVATION IN THE U.S. HIGH-TECH SECTOR

J. David Brown
John S. Earle
Mee Jung Kim
Kyung Min Lee

February 2019

We estimate differences in innovation behavior between foreign- versus U.S.-born entrepreneurs in high-tech industries. Our data come from the Annual Survey of Entrepreneurs, a random sample of firms with detailed information on owner characteristics and innovation activities. We find uniformly higher rates of innovation in immigrant-owned firms for 15 of 16 different innovation measures; the only exception is for copyright/trademark. The immigrant advantage holds for older firms as well as for recent start-ups and for

every level of the entrepreneur's education. The size of the estimated immigrant-native differences in product and process innovation activities rises with detailed controls for demographic and human capital characteristics but falls for research, development, and patenting. Controlling for finance, motivations, and industry reduces all coefficients, but for most measures and specifications, immigrants are estimated to have a sizable advantage in innovation.

**DOWNWARD NOMINAL WAGE RIGIDITY IN THE UNITED STATES:
NEW EVIDENCE FROM WORKER-FIRM LINKED DATA**

André Kurmann
Erika McEntarfer

February 2019

This paper examines the extent and consequences of Downward Nominal Wage Rigidity (DNWR) using administrative worker-firm linked data from the Longitudinal Employer Household Dynamics (LEHD) program for a large representative U.S. state. Prior to the Great Recession, only 7–8 percent of job stayers are paid the same nominal hourly wage rate as 1 year earlier—substantially less than previously found in survey-based data—and about 20 percent of job stayers experience a wage cut. During the Great Recession, the incidence of wage cuts increases to 30 percent, followed by a large rise in the proportion of wage freezes to 16 percent as the economy recovers. Total earnings of job stayers exhibit even fewer zero changes and a larger incidence of reductions

than hourly wage rates due to systematic variations in hours worked. The results are consistent with concurrent findings in the literature that reductions in base pay are exceedingly rare but that firms use different forms of nonbase pay and variations in hours worked to flexibilize labor cost. We then exploit the worker-firm link of the LEHD and find that during the Great Recession, firms with indicators of DNWR reduced employment by about 1.2 percent more per year. This negative effect is driven by significantly lower hiring rates and persists into the recovery. Our results suggest that despite the relatively large incidence of wage cuts in the aggregate, DNWR has sizable allocative consequences.

Center for Economic Studies Working Paper 19-08

**OPTIMAL PROBABILISTIC RECORD LINKAGE:
BEST PRACTICE FOR LINKING EMPLOYERS IN SURVEY AND ADMINISTRATIVE DATA**

John M. Abowd
Joelle Abramowitz
Margaret C. Levenstein
Kristin McCue
Dhiren Patki
Trivellore Raghunathan
Ann M. Rodgers
Matthew D. Shapiro
Nada Wasi

March 2019

This paper illustrates an application of record linkage between a household-level survey and an establishment-level frame in the absence of unique identifiers. Linkage between frames in this setting is challenging because the distribution of employment across firms is highly asymmetric. To address these difficulties, this paper uses a supervised, machine-learning model to probabilistically link survey respondents in the Health and Retirement

Study (HRS) with employers and establishments in the Census Bureau's Business Register to create a new data source, which we call the CenHRS. Multiple imputation is used to propagate uncertainty from the linkage step into subsequent analyses of the linked data. The linked data reveal new evidence that survey respondents' misreporting and selective nonresponse about employer characteristics are systematically correlated with wages.

Center for Economic Studies Working Paper 19-09

**WHY THE ECONOMICS PROFESSION MUST ACTIVELY PARTICIPATE IN THE PRIVACY
PROTECTION DEBATE**

John M. Abowd
Ian M. Schmutte
William N. Sexton
Lars Vilhuber

March 2019

When Google or the U.S. Census Bureau publish detailed statistics on browsing habits or neighborhood characteristics, some privacy is lost for everybody while supplying public information. To date, economists have not focused on the privacy loss inherent in data publication. In their stead, these issues have been advanced almost exclusively by computer scientists who are primarily

interested in technical problems associated with protecting privacy. Economists should join the discussion, first, to determine where to balance privacy protection against data quality; a social choice problem. Furthermore, economists must ensure new privacy models preserve the validity of public data for economic research.

Center for Economic Studies Working Paper 19-10

**IMMIGRANTS' EARNINGS GROWTH AND RETURN MIGRATION FROM THE UNITED STATES:
EXAMINING THEIR DETERMINANTS USING LINKED SURVEY AND ADMINISTRATIVE DATA**

Randall Akee
Maggie R. Jones

March 2019

Using a novel panel data set of recent immigrants to the United States (2005–2007) from individual-level linked U.S. Census Bureau survey data and Internal Revenue Service administrative records, we identify the determinants of return migration and earnings growth for this immigrant arrival cohort. We show that by 10 years after arrival, almost 40 percent have return migrated. Our analysis examines these flows by educational attainment, country of birth, and English language ability separately for each gender. We show, for the first time, that return migrants experience downward earnings mobility over 2 to 3 years prior to their return migration. This finding suggests that economic shocks are closely

related to emigration decisions; time-variant unobserved characteristics may be more important in determining out-migration than previously known. We also show that wage assimilation with native-born populations occurs fairly quickly; after 10 years there is strong convergence in earnings by several characteristics. Finally, we confirm that the use of stock-based panel data lead to estimates of slower earnings growth than is found using repeated cross-section data. However, we also show, using selection-correction methods in our panel data, that stock-based panel data may understate the rate of earnings growth for the initial immigrant arrival cohort when emigration is not accounted for.

Center for Economic Studies Working Paper 19-11

STATISTICS ON THE SMALL BUSINESS ADMINISTRATION'S SCALE-UP AMERICA PROGRAM

C.J. Krizan

April 2019

This paper attempts to quantify the difference in performance, of “treated” (program participant) and “nontreated” (nonparticipant) firms in the Small Business Administration’s (SBA) Scale-Up initiative. I combine data from the SBA with administrative data housed at the U.S. Census Bureau using a combination of numeric and name and address matching techniques. My results show that after controlling for available observable characteristics, a positive correlation exists between participation in the Scale-Up initiative and firm

growth. However, publicly available survey results have shown that entrepreneurs have a variety of goals in-mind when they start their businesses. Two prominent, and potentially contradictory, ones are work-life balance and greater income. That means that not all firms may want to grow and I am unable to completely control for owner motivations. Finally, I do not find a statistically significant relationship between participation in Scale-Up and firm survival once other business characteristics are accounted for.

Center for Economic Studies Working Paper 19-13

**RELEASING EARNINGS DISTRIBUTIONS USING DIFFERENTIAL PRIVACY:
DISCLOSURE AVOIDANCE SYSTEM FOR POST-SECONDARY EMPLOYMENT OUTCOMES
(PSEO)**

Andrew Foote
Ashwin Machanavajjhala
Kevin McKinney

April 2019

The U.S. Census Bureau recently released data on earnings percentiles of graduates from post-secondary institutions. This paper describes and evaluates the disclosure avoidance system developed for these statistics. We propose a differentially private algorithm for releasing these data based on standard differentially private building blocks, by constructing a histogram of earnings

and the application of the Laplace mechanism to recover a differentially private cumulative density function of earnings. We demonstrate that our algorithm can release earnings distributions with low error, and our algorithm out-performs prior work based on the concept of smooth sensitivity from Nissim, Raskhodnikova, and Smith (2007).

Center for Economic Studies Working Paper 19-14

**THE ANTIPOVERTY IMPACT OF THE EITC:
NEW ESTIMATES FROM SURVEY AND ADMINISTRATIVE TAX RECORDS**

Maggie R. Jones
James P. Ziliak

April 2019

Evaluations of the Earned Income Tax Credit (EITC), including its antipoverty effectiveness, are based on simulated EITC benefits using either the U.S. Census Bureau's tax module or from external tax simulators such as the National Bureau of Economic Research's TAXSIM or Jon Bakija's model. Each simulator utilizes model-based assumptions on who is and who is not eligible for the EITC, and conditional on eligibility, assumes that participation is 100 percent. However, recent evidence suggests that take-up of the EITC is considerably less than 100 percent, and thus claims regarding the impact of the program on measures of poverty may be overstated. We use data from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) linked to Internal Revenue Service tax data on the EITC to compare the distribution of EITC benefits from three tax simulation modules to administrative

tax records. We find that significantly more actual EITC payments flow to childless tax units than predicted by the tax simulators, and to those whose family income places them well above official poverty thresholds. However, actual EITC payments appear to be target efficient at the individual tax unit level, whether correctly paid or not. We then compare the antipoverty impact of the EITC across the survey and administrative tax measures of EITC benefits. We find that in the full CPS ASEC, the tax simulators overestimate the antipoverty effects of the EITC by about 1.8 million persons in a typical year. Restricting to a harmonized sample of filers, we find that the antipoverty estimates derived from the TAXSIM and Bakija models align more closely to actual EITC payments compared to the CPS, suggesting a discrepancy in assignment of tax filers between the tax simulators.

Center for Economic Studies Working Paper 19-17

FOREIGN VS. U.S. GRADUATE DEGREES: THE IMPACT ON EARNINGS ASSIMILATION AND RETURN MIGRATION FOR THE FOREIGN BORN

Randall Akee
Maggie R. Jones

June 2019

Using a novel panel data set of recent immigrants to the United States, we identify return migration rates and earnings trajectories of two immigrant groups: those with foreign graduate degrees and those with a U.S. graduate degree. We focus on immigrants (of both genders) to the United States who arrive in the same entry cohort and from the

same country of birth over the period 2005–2015. In Census-Internal Revenue Service administrative data, we found that downward earnings trajectories are predictive of return migration for immigrants with degrees acquired abroad. Meanwhile, immigrants with U.S.-acquired graduate degrees experience mainly upward earnings mobility.

Center for Economic Studies Working Paper 19-18

PREDICTING THE EFFECT OF ADDING A CITIZENSHIP QUESTION TO THE 2020 CENSUS

J. David Brown
Misty L. Heggeness
Suzanne M. Dorinski
Lawrence Warren
Moises Yi

June 2019

The addition of a citizenship question to the 2020 Census could affect the self-response rate, a key driver of the cost and quality of a census. We find that citizenship question response patterns in the American Community Survey (ACS) suggest that it is a sensitive question when asked about administrative record noncitizens but not when asked about administrative record citizens. ACS respondents who were administrative record noncitizens in 2017 frequently choose to skip the question or answer that the person is a citizen. We predict the effect on self-response to the entire survey by comparing mail response rates in the 2010 ACS, which included a citizenship question, with those of the 2010 Census, which did not have a citizenship question, among households in both surveys. We compare the actual

ACS-census difference in response rates for households that may contain noncitizens (more sensitive to the question) with the difference for households containing only U.S. citizens. We estimate that the addition of a citizenship question will have an 8.0 percentage point larger effect on self-response rates in households that may have noncitizens relative to those with only U.S. citizens. Assuming that the citizenship question does not affect unit self-response in all-citizen households and applying the 8.0 percentage-point drop to the 28.1 percent of housing units potentially having at least one noncitizen would predict an overall 2.2 percentage-point drop in self-response in the 2020 Census, increasing costs and reducing the quality of the population count.

**AUTOMATING RESPONSE EVALUATION FOR FRANCHISING QUESTIONS
ON THE 2017 ECONOMIC CENSUS**

Joseph Staudt
Yifang Wei
Lisa Singh
Shawn Klimek
J. Bradford Jensen
Andrew L. Baer

July 2019

Between the 2007 and 2012 Economic Censuses (EC), the count of franchise-affiliated establishments declined by 9.8 percent. One reason for this decline was a reduction in resources that the U.S. Census Bureau was able to dedicate to the manual evaluation of survey responses in the franchise section of the EC. Extensive manual evaluation in 2007 resulted in many establishments, whose survey forms indicated they were not franchise-affiliated, being recoded as franchise-affiliated. No such evaluation could be undertaken

in 2012. In this paper, we examine the potential of using external data harvested from the Web in combination with machine learning methods to automate the process of evaluating responses to the franchise section of the 2017 EC. Our method allows us to quickly and accurately identify and recode establishments have been mistakenly classified as not being franchise-affiliated, increasing the unweighted number of franchise-affiliated establishments in the 2017 EC by 22 percent–42 percent.

REENGINEERING KEY NATIONAL ECONOMIC INDICATORS

Gabriel Ehrlich
John Haltiwanger
Ron Jarmin
David Johnson
Matthew D. Shapiro

July 2019

Traditional methods of collecting data from businesses and households face increasing challenges. These include declining response rates to surveys, increasing costs to traditional modes of data collection, and the difficulty of keeping pace with rapid changes in the economy. The digitization of virtually all market transactions offers the potential for reengineering key national economic indicators. The challenge for the statistical system is how to operate in this data-rich environment. This paper focuses on the opportunities for collecting item-level data at the source and constructing key indicators using measurement methods consistent with such a data infrastructure. Ubiquitous digitization of transactions allows price and quantity

be collected or aggregated simultaneously at the source. This new architecture for economic statistics creates challenges arising from the rapid change in items sold. The paper explores some recently proposed techniques for estimating price and quantity indices in large-scale, item-level data. Although those methods display tremendous promise, substantially more research is necessary before they will be ready to serve as the basis for the official economic statistics. Finally, the paper addresses implications for building national statistics from transactions for data collection and for the capabilities and organization of the statistical agencies in the twenty-first century.

**GENDER DIFFERENCES IN SELF-EMPLOYMENT DURATION:
THE CASE OF OPPORTUNITY AND NECESSITY ENTREPRENEURS**

Adela Luque
Maggie R. Jones

September 2019

A strand of the self-employment literature suggests that those “pushed” into self-employment out of necessity may perform differently from those “pulled” into self-employment to pursue a business opportunity. While findings on self-employment outcomes by self-employed type are not unanimous, there is mounting evidence that performance outcomes differ between these two self-employed types. Another strand of the literature has found important gender differences in self-employment entry rates, motivations for entry, and outcomes. Using a unique set of data that links the American Community Survey to administrative data from Form 1040 and W-2 records, we bring together these two strands of the literature. We explore whether there are gender differences in self-employment duration of self-employed types. In particular, we examine the likelihood of self-employment exit towards unemployment versus

the wage sector for five consecutive entry cohorts, including two cohorts who entered self-employment during the Great Recession. Severely limited labor-market opportunities may have driven many in the recession cohorts to enter self-employment, while those entering self-employment during the boom may have been pursuing opportunities under favorable market conditions. To more explicitly test the concept of “necessity” versus “opportunity” self-employment, we also examine the wage labor attachment (or weeks worked in the wage sector) in the year prior to becoming self-employed. We find that, within the cohorts we examine, there are gender differences in the rate at which men and women depart self-employment for either wage work or nonparticipation, but that the patterns are dependent on pre-self-employment wage-sector attachment and cohort effects.

**DID TIMING MATTER? LIFE CYCLE DIFFERENCES IN EFFECTS OF EXPOSURE
TO THE GREAT RECESSION**

Kevin Rinz

September 2019

Exposure to a recession can have persistent, negative consequences, but does the severity of those consequences depend on when in the life cycle a person is exposed? I estimate the effects of exposure to the Great Recession on employment and earnings outcomes for groups defined by year of birth over the 10 years following the beginning of the recession. With the exception of the oldest workers, all groups experience reductions in earnings and employment due to local unemployment rate shocks during the recession. Younger workers

experience the largest earnings losses in percent terms (up to 13 percent), in part because recession exposure makes them persistently less likely to work for high-paying employers even as their overall employment recovers more quickly than older workers'. Younger workers also experience reductions in earnings and employment due to changes in local labor market structure associated with the recession. These effects are substantially smaller in magnitude but more persistent than the effects of unemployment rate increases.

HIGH LABOR FORCE ATTACHMENT, BUT FEW SOCIAL TIES? LIFE-COURSE PREDICTORS OF WOMEN'S RECEIPT OF CHILDCARE SUBSIDIES

Rachel Shattuck

September 2019

The U.S. federal Child Care and Development Fund (CCDF) childcare subsidy represents the largest source of means-tested assistance for U.S. families with low incomes. The CCDF subsidy aims to help mothers with low incomes gain employment and education, with implications for women's labor force participation, and the well-being of their children. Because recipients of the CCDF subsidy are either already employed, or seek the subsidy with the goal of gaining employment or schooling, this group may represent the public assistance recipients who are best able to succeed in the low-wage labor market. However, existing research on the CCDF observes recipients only after they begin receiving the subsidy, thus giving an incomplete picture of whether recipients may select

into subsidy receipt, and how subsidy recipiency is situated in women's broader work and family trajectories. My study links administrative records from the CCDF to the American Community Survey (ACS) to construct a longitudinal data set from 38 states that observes CCDF recipients in the 1-2 years before they first received the subsidy. I compare women who subsequently received the CCDF subsidy to other women with low incomes in the ACS who did not go on to receive the subsidy, with a total of roughly 641,000 individuals. I find that CCDF recipients are generally positively selected on employment history and educational attainment, but appear to have lower levels of social support than nonrecipients.

A TASK-BASED APPROACH TO CONSTRUCTING OCCUPATIONAL CATEGORIES WITH IMPLICATIONS FOR EMPIRICAL RESEARCH IN LABOR ECONOMICS

Julia Manzella

Evan Totty

Gary Benedetto

September 2019

Most applied research in labor economics that examines returns to worker skills or differences in earnings across subgroups of workers typically accounts for the role of occupations by controlling for occupational categories. Researchers often aggregate detailed occupations into categories based on the Standard Occupation Classification (SOC) coding scheme, which is based largely on narratives or qualitative measures of workers' tasks. Alternatively, we propose two quantitative task-based approaches to constructing occupational categories by using factor analysis with O*NET job descriptors that provide a rich set of continuous measures of job tasks across all occupations. We find that our task-based approach outperforms the SOC-based approach in terms of lower occupation distance measures. We show that our task-based approach provides an intuitive,

nuanced interpretation for grouping occupations and permits quantitative assessments of similarities in task compositions across occupations. We also replicate a recent analysis and find that our task-based occupational categories explain more of the gender wage gap than the SOC-based approaches explain. Our study enhances the Federal Statistical System's understanding of the SOC codes, investigates ways to use third-party data to construct useful research variables that can potentially be added to U.S. Census Bureau data products to improve their quality and versatility, and sheds light on how the use of alternative occupational categories in economics research may lead to different empirical results and deeper understanding in the analysis of labor market outcomes.

Center for Economic Studies Working Paper 19-28

ADDRESSING DATA GAPS: FOUR NEW LINES OF INQUIRY IN THE 2017 ECONOMIC CENSUS

Emek Basker
Randy A. Becker
Lucia Foster
T. Kirk White
Alice Zawacki

September 2019

We describe four new lines of inquiry added to the 2017 Economic Census regarding (1) retail health clinics, (2) management practices in health care services, (3) self-service in retail and service industries, and (4) water use in manufacturing and mining industries. These were proposed by economists from the U.S. Census Bureau's Center for Economic Studies in order to fill data gaps in

current Census Bureau products concerning the U.S. economy. The new content addresses, such issues as the rise in importance of health care and its complexity, the adoption of automation technologies, and the importance of measuring water, a critical input to many manufacturing and mining industries.

Center for Economic Studies Working Paper 19-29

**WHO GAINS FROM CREATIVE DESTRUCTION?
EVIDENCE FROM HIGH-QUALITY ENTREPRENEURSHIP IN THE UNITED STATES**

Astrid Marinoni
John Voorheis

October 2019

The question of who gains from high-quality entrepreneurship is crucial to understanding whether investments in incubating potentially innovative start-up firms will produce socially beneficial outcomes. We attempt to bring new evidence to this question by combining new aggregate measures of local area income inequality and income mobility with measures of entrepreneurship from Guzman and Stern (2017). Our new aggregate measures are generated by linking American Community Survey data with the universe of Internal Revenue Service 1040 tax

returns. In both fixed effects and IV models using a Bartik-style instrument, we find that entrepreneurship increases income inequality. Further, we find that this increase in income inequality arises due to the fact that almost all of the individual gains associated with increased entrepreneurship accrue to the top 10 percent of the income distribution. While we find mixed evidence for small positive effects of entrepreneurship lower on the income distribution, we find little, if any, evidence that entrepreneurship increases income mobility.

Center for Economic Studies Working Paper 19-32
FOUNDING TEAMS AND STARTUP PERFORMANCE

Joonkyu Choi
Nathan Goldschlag
John Haltiwanger
J. Daniel Kim

November 2019

We explore the role of founding teams in accounting for the postentry dynamics of startups. While the entrepreneurship literature has largely focused on business founders, we broaden this view by considering founding teams, which include both the founders and the initial employees in the first year of operations. We investigate the idea that the success of a startup may derive from the organizational capital that is created at firm formation and is inalienable from the founding team itself. To test this hypothesis, we exploit premature deaths to identify the causal impact of losing a founding team member on startup performance. We find

that the exogenous separation of a founding team member due to premature death has a persistently large, negative, and statistically significant impact on postentry size, survival, and productivity of startups. While we find that the loss of a key founding team member (e.g. founders) has an especially large adverse effect, the loss of a non-key founding team member still has a significant adverse effect, lending support to our inclusive definition of founding teams. Furthermore, we find that the effects are particularly strong for small founding teams but are not driven by activity in small business-intensive or high-tech industries.

Center for Economic Studies Working Paper 19-33
MATERNAL LABOR DYNAMICS: PARTICIPATION, EARNINGS, AND EMPLOYER CHANGES

Danielle Sandler
Nichole Szembrot

December 2019

This paper describes the labor dynamics of U.S. women after they have had their first and subsequent children. We build on the child penalty literature by showing the heterogeneity of the size and pattern of labor force participation and earnings losses by demographic characteristics of mothers and the characteristics of their employers. The analysis uses longitudinal administrative earnings data from the Longitudinal Employer-Household Dynamics database combined with the Survey of Income and Program Participation survey data to identify women, their fertility timing, and employment. We find that women experience a large and persistent decrease in earnings

and labor force participation after having their first child. The penalty grows over time, driven by the birth of subsequent children. Non-White mothers, unmarried mothers, and mothers with more education are more likely to return to work following the birth of their first child. Conditional on returning to the labor force, women who change employers earn more after the birth of their first child than women who return to their prebirth employers. The probability of returning to the prebirth employer and industry is heterogeneous over both the demographics of mothers and the characteristics of their employers.

**NONEMPLOYER STATISTICS BY DEMOGRAPHICS (NES-D): EXPLORING LONGITUDINAL
CONSISTENCY AND SUBNATIONAL ESTIMATES**

Adela Luque
Michaela Dillon
Julia Manzella
James Noon
Kevin Rinz
Victoria Udalova

December 2019

Until recently, the quinquennial Survey of Business Owners (SBO) was the only source of information for U.S. employer and nonemployer businesses by owner demographic characteristics such as race, ethnicity, sex, and veteran status. Now, however, the Nonemployer Statistics by Demographics series (NES-D) will replace the SBO's nonemployer component with reliable and more frequent (annual) business demographic estimates with no additional respondent burden, and at lower imputation rates and costs. NES-D is not a survey; rather, it exploits existing administrative and census records to assign demographic characteristics to the universe of approximately 25 million (as of 2016) nonemployer businesses.

Although only in the second year of its research phase, NES-D is rapidly moving towards production, with a planned prototype or experimental version release of 2017 nonemployer data in 2020, followed by annual releases of the series. After the first year of research, we released a working paper (Luque et al., 2019) that assessed the viability of estimating nonemployer demographics exclusively with administrative records (AR) and census data. That paper used 1 year of data (2015) to produce preliminary tabulations of business counts at the national level. This year we expand that research in multiple ways by: (1) examining the longitudinal consistency of administrative and census records coverage, and of our AR-based demographics estimates, (2) evaluating further coverage from additional data sources, (3) exploring estimates

at the subnational level, (4) exploring estimates by industrial sector, (5) examining demographics estimates of business receipts as well as of counts, and (6) implementing imputation of missing demographic values.

Our current results are consistent with the main findings in Luque et al. (2019), and show that high coverage and demographic assignment rates are not the exception, but the norm. Specifically, we find that AR coverage rates are high and stable over time for each of the 3 years we examine, 2014–2016. We are able to identify owners for approximately 99 percent of nonemployer businesses (excluding C-corporations), 92 to 93 percent of identified nonemployer owners have no missing demographics, and only about 1 percent are missing three or more demographic characteristics in each of the 3 years. We also find that our demographics estimates are stable over time, with expected small annual changes that are consistent with underlying population trends in the United States. Due to data limitations, these results do not include C-corporations, which represent only 2 percent of nonemployer businesses and 4 percent of receipts.

Without added respondent burden and at lower imputation rates and costs, NES-D will provide high-quality business demographics estimates at a higher frequency (annual vs. every 5 years) than the SBO.

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Appendix 4.

CENTER FOR ECONOMIC STUDIES WORKING PAPERS: 2019

CES Working Papers are available at <www.census.gov/programs-surveys/ces/research/ces-discussion-paper-series.html>.

| | | | |
|-------|--|-------|---|
| 19-01 | “Nonemployer Statistics by Demographics (NES-D): Using Administrative and Census Records Data in Business Statistics,” by Adela Luque, Renuka Bhaskar, James Noon, Kevin Rinz, and Victoria Udalova, January 2019. | 19-08 | “Optimal Probabilistic Record Linkage: Best Practice for Linking Employers in Survey and Administrative Data,” by John M. Abowd, Joelle Abramowitz, Margaret C. Levenstein, Kristin McCue, Dhiren Patki, Trivellore Raghunathan, Ann M. Rodgers, Matthew D. Shapiro, and Nada Wasi, March 2019. |
| 19-02 | “Predictive Analytics and Organizational Architecture: Plant-Level Evidence from Census Data,” by Eva Labro, Mark Lang, and Jim Omartian, January 2019. | 19-09 | “Why the Economics Profession Must Actively Participate in the Privacy Protection Debate,” by John M. Abowd, Ian M. Schmutte, William N. Sexton, and Lars Vilhuber, March 2019. |
| 19-03 | “Why Are Employer-Sponsored Health Insurance Premiums Higher in the Public Sector than in the Private Sector?” by Alice M. Zawacki, Jessica P. Vistnes, and Thomas C. Buchmueller, February 2019. | 19-10 | “Immigrants’ Earnings Growth and Return Migration from the US: Examining their Determinants using Linked Survey and Administrative Data,” by Randall Akee and Maggie R. Jones, March 2019. |
| 19-04 | “The Effect of Child Support on Selection into Marriage and Fertility,” by Daniel I. Tannenbaum, February 2019. | 19-11 | “Statistics on the Small Business Administration’s Scale-Up America Program,” by C.J. Krizan, March 2019. |
| 19-05 | “Do Institutions Determine Economic Geography? Evidence from the Concentration of Foreign Suppliers,” by Fariha Kamal and Asha Sundaram, February 2019. | 19-12 | “Fraudulent Financial Reporting and the Consequences for Employees,” by Jung Ho Choi and Brandon Gipper, March 2019. |
| 19-06 | “Immigrant Entrepreneurs and Innovation in the U.S. High-Tech Sector,” by J. David Brown, John S. Earle, Mee Jung Kim, and Kyung Min Lee, February 2019. | 19-13 | “Releasing Earnings Distributions using Differential Privacy: Disclosure Avoidance System for Post Secondary Employment Outcomes (PSEO),” by Andrew Foote, Ashwin Machanavajjhala, and Kevin McKinney, April 2019. |
| 19-07 | “Downward Nominal Wage Rigidity in the United States: New Evidence from Worker-Firm Linked Data,” by André Kurmann and Erika McEntarfer, February 2019. | 19-14 | “The Antipoverty Impact of the EITC: New Estimates from Survey and Administrative Tax Records,” by Maggie R. Jones and James P. Ziliak, April 2019. |

| | | | |
|-------|--|-------|---|
| 19-15 | “Managing Trade: Evidence From China and the U.S.,” by Nicholas Bloom, Kalina Manova, John Van Reenen, Stephen Teng Sun, and Zhihong Yu, May 2019. | 19-24 | “Gender Differences in Self-employment Duration: the Case of Opportunity and Necessity Entrepreneurs,” by Adela Luque and Maggie R. Jones, September 2019. |
| 19-16 | “Property Rights, Place-Based Policies, and Economic Development,” by Laurel Wheeler, June 2019. | 19-25 | “Did Timing Matter? Life Cycle Differences in Effects of Exposure to the Great Recession,” by Kevin Rinz, September 2019. |
| 19-17 | “Foreign vs. U.S. Graduate Degrees: The Impact on Earnings Assimilation and Return Migration for the Foreign Born,” by Randall Akee and Maggie R. Jones, June 2019. | 19-26 | “High Labor Force Attachment, but Few Social Ties? Life-Course Predictors of Women’s Receipt of Childcare Subsidies,” by Rachel Shattuck, September 2019. |
| 19-18 | “Predicting the Effect of Adding a Citizenship Question to the 2020 Census,” by J. David Brown, Misty L. Heggeness, Suzanne M. Dorinski, Lawrence Warren, and Moises Yi, June 2019. | 19-27 | “A Task-based Approach to Constructing Occupational Categories with Implications for Empirical Research in Labor Economics,” by Julia Manzella, Evan Totty, and Gary Benedetto, September 2019. |
| 19-19 | “The Two-Income Trap: Are Two-Earner Households More Financially Vulnerable?” by Jonathan Fisher and Nathaniel Johnson, June 2019. | 19-28 | “Addressing Data Gaps: Four New Lines of Inquiry in the 2017 Economic Census,” by Emek Basker, Randy A. Becker, Lucia Foster, T. Kirk White, and Alice Zawacki, September 2019. |
| 19-20 | “Automating Response Evaluation for Franchising Questions on the 2017 Economic Census,” by Joseph Staudt, Yifang Wei, Lisa Singh, Shawn Klimek, J. Bradford Jensen, and Andrew L. Baer, July 2019. | 19-29 | “Who Gains from Creative Destruction? Evidence from High-Quality Entrepreneurship in the United States,” by Astrid Marinoni and John Voorheis, October 2019. |
| 19-21 | “Demographic Origins of the Startup Deficit,” by Fatih Karahan, Benjamin Pugsley, and Aysegül Sahin, July 2019. | 19-30 | “Human Capital, Parent Size and the Destination Industry of Spinouts,” by Mariko Sakakibara and Natarajan Balasubramanian, September 2019. |
| 19-22 | “Re-engineering Key National Economic Indicators,” by Gabriel Ehrlich, John Haltiwanger, Ron Jarmin, David Johnson, and Matthew D. Shapiro, July 2019. | 19-31 | “What Do Establishments Do When Wages Increase? Evidence from Minimum Wages in the United States,” by Yuci Chen, November 2019. |
| 19-23 | “Pay, Employment, and Dynamics of Young Firms,” by Tania Babina, Wenting Ma, Christian Moser, Paige Ouimet, and Rebecca Zarutskie, July 2019. | | |

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- 19-32 “Founding Teams and Startup Performance,” by Joonkyu Choi, Nathan Goldschlag, John Haltiwanger, and J. Daniel Kim, November 2019.
- 19-33 “Maternal Labor Dynamics: Participation, Earnings, and Employer Changes,” by Danielle Sandler and Nichole Szembrot, December 2019.

- 19-34 “Nonemployer Statistics by Demographics (NES-D): Exploring Longitudinal Consistency and Sub-national Estimates,” by Adela Luque, Michaela Dillon, Julia Manzella, James Noon, Kevin Rinz, and Victoria Udalova, December 2019.

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Appendix 5.

LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD) PARTNERS

Under the Local Employment Dynamics (LED) Partnership, the Longitudinal Employer-Household Dynamics (LEHD) research team at the Center for Economic Studies produces new, cost effective, public-use information combining federal, state, and U.S. Census Bureau data on employers and employees. The LED Partnership works to fill critical data gaps and provide indicators increasingly needed by state and local authorities to make informed decisions affecting their economies and workforces.

LOCAL EMPLOYMENT DYNAMICS (LED) STEERING COMMITTEE

As of January 2020.

New England (*Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont*)

Patrick Flaherty, Assistant Director
Office of Research and Information
Connecticut Department of Labor

New York/New Jersey (*New York, New Jersey, Puerto Rico, U.S. Virgin Islands*)

Leonard Preston, Chief
Labor Market Information
New Jersey Department of Labor and
Workforce Development

Mid-Atlantic (*Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia*)

Tim Kestner, Director
Economic Information and Analytics Division
Virginia Employment Commission

Southeast (*Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee*)

Adrienne Johnston, Chief
Bureau of Labor Market Statistics
Florida Department of Economic Opportunity

Midwest (*Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin*)

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Oregon Employment Department

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U.S. Department of Commerce, National Oceanic
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Hurricane Center
U.S. Department of Homeland Security,
Federal Emergency Management Agency
U.S. Department of the Interior
U.S. Office of Personnel Management
U.S. Bureau of Labor Statistics
U.S. Geological Survey, Geospatial Multi-Agency
Coordination
Internal Revenue Service
U.S. Army

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Colorado Department of Higher Education
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in partnership with:
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As of January 2020.

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Appendix 6. CENTER FOR ECONOMIC STUDIES ORGANIZATIONAL CHART (February 2020)

