Modernizing Economic Statistics through Public-Private Partnerships


September 13, 2016

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U.S. Census Bureau
“Official” Economic Statistics: Current Status

- Structure and methods more or less the same as developed to respond to the Great Depression and World War II
- Dispersed across several agencies
- Reliant on surveys as primary means to capture source data
- Administrative records used primarily to aid surveys - e.g., sample frames, imputation etc.
20th Century Economic Statistics

Survey Respondents
- Businesses
- Households
- Organizations

Non Survey Data Providers
- Federal & State Admin Data
- Other data

Stat Agencies
- Survey estimates
- Computed statistics (e.g., GDP)
- Reports / Analysis

Data Users
- Policy Makers
- Business
- Media
- Researchers
- Public
Evolving User Needs

- Desire for more timely and detailed versions of “mainline” estimates.
- Desire for higher moments
- Linkage to and/or benchmarking for non-official datasets
- Address data gaps
- More demand for microdata
  - increasingly difficult to ensure confidentiality AND utility of PUMS files
What’s the Role of “Private” Data in Federal Economic Statistics?

- Survey based source data ARE “private”
- Released estimates are “public”
- So, we’re talking about changing the characteristics of the “private” source data we use to construct and disseminate “public” economic statistics –
  - Timeliness
  - Domain detail
  - Or the “V’s” of big data
- Can’t accomplish with survey-centric measurement system
Need for Innovation: Carrot and Stick

- **Stick**
  - Declining survey response rates / Increasing costs
  - Declining relevance of current measurement activities
    - Economy evolving faster than measurement
    - Increased availability of alternatives
  - Flat or declining budgets

- **Carrot**
  - New data sources
  - Improved computing and analytics
  - Increased demand for economic statistics
“Big Data” “Source Data”
Research Agenda for Federal Economic Statistics

- Methodological
- Computational
- Policy / Legal
- User and Stakeholder Engagement
Partnership Example: Innovation Measurement Initiative

- Collaborative research project between Census, University of Michigan, Ohio State, University of Chicago and NYU.
- Integrate university data on federally funded research grants with Census Bureau data assets.
- Produce statistics consistent with the Bureau’s economic and social measurement mission and directly relevant to the data provider.
IMI Background

- Census Goals:
  - Improve measurement of small but important sector of the economy
  - Address data gaps in the measurement of innovation and relation to economic growth
  - Learn how to collaborate with data providers to deliver data products they value
  - Prototype project that can be scaled and extended to other sectors of the economy
IMI Background

- Innovative Aspects:
  - Collaboration with the University of Michigan’s Institute on Research in Innovation and Science (IRIS)
  - Experiment with utilizing “fat pipe” of data for a sector of the economy
  - The University data are complementary to business and household data at Census
University Data: UMETRICS

- UMETRICS
  - is a CIC initiative to create independent statistical evidence about the value of university research
  - provides valuable information for outreach to Federal, State, and Local constituents
  - integrates university administrative data with restricted U.S. Census Bureau data and many other resources

- Results below use the original UMETRICS data

- Going forward, all data will be sourced from IRIS
Data on Spending

$1.949 Billion in Direct Cost Vendor Purchases from 9 CIC Universities, Q3 2012-Q4 2014
Data on People

75,375 employees by type, 9 CIC Universities, Q3 2012-Q4 2014

- Faculty: 12,499
- Staff: 20,144
- Post-Doc: 6,974
- Grad: 17,646
- Undergrad: 18,112
Framework

Science Investments → Universities

Discovery, Learning, Training, Dissemination

Fund

Knowledge, People, Skills

Hiring, Spending

Jobs, Stimulus

Innovation, Entrepreneurship, Economic Growth
Partnership Products

- Hot Reports tailored for the universities
- Other public use products TBD
- Research Papers
- Restricted Use Data made available through the Federal Statistical Research Data Center network
Sample Products: Hot Reports

Federal Funds to CIC Universities Supported Research-Related Expenditures Across the US

Federal research funds from the nine universities in the study were used to purchase over $1.87 billion in goods and services from 1,772 counties across the US.

The expenditures of federal research funds by the nine CIC institutions in the report resulted in purchases of $438 million in goods and services from 604 counties in the eight states represented.

Geographic location of purchases resulting from federal awards to nine CIC universities (Q3 2013 - Q2 2014):

- Illinois
- Indiana
- Iowa
- Michigan
- Minnesota
- Ohio
- Pennsylvania
- Wisconsin

Individuals Employed by Federal Research Funding

Between the second quarter of 2011 and the first quarter of 2014, Federal research awards supported a yearly average of 6,851 individuals at U-State.

Students constituted an average of 51% of individuals supported by federal research funding every year, while faculty employees comprised an average of 15%.

Yearly counts of total individuals on U-State University Federal research awards, broken down by occupational category (2011 Q2 - 2014 Q1):

Organizational Breakdown of Employment Patterns on Federal Research Awards to U-State University, aggregated across 2011 Q2 - 2014 Q1:

Breakdown of employment patterns on Federal research awards to
U-State University, aggregated across 2011 Q2 - 2014 Q1

- Professor
- Doctoral
- Research Scientist
- Research Support
- Other Scientific
- Student
- Post-Doctoral
- Research Assistant
- Research Associate
- Post-Doctoral Fellow

National Distribution of Research-Related Expenditures

The production of science requires the purchase of scientific equipment and technology as well as collaboration with private/public research organizations.

University research expenditures exceeded $211 million from 2011 Q2 - 2014 Q1.

Total vendor & subaward expenditures on federal research awards to U-State University, aggregated across 2011 Q2 - 2014 Q1

- $1 - $500
- $500 - $1,000
- $1,000 - $5,000
- $5,000 - $10,000
- $10,000 - $25,000
- $25,000 - $50,000
- $50,000 - $100,000
- $100,000 - $250,000
- $250,000 - $500,000
- $500,000 - $1,000,000
- $1,000,000 - $10,000,000
- $10,000,000 - $50,000,000
- $50,000,000 - $100,000,000

Regional Distribution of Research-Related Expenditures

Between 2011 Q2 - 2014 Q1, U-State University research generated over $24 million in expenditures in Indiana counties alone.

Purchases from Marion county vendors exceeded $8 million.

Federal research award expenditures on vendors & subawards in Indiana counties, aggregated across 2011 Q2 - 2014 Q1

- $1 - $500
- $500 - $1,000
- $1,000 - $5,000
- $5,000 - $10,000
- $10,000 - $25,000
- $25,000 - $50,000
- $50,000 - $100,000
- $100,000 - $250,000
- $250,000 - $500,000
- $500,000 - $1,000,000
- $1,000,000 - $2,000,000
- $2,000,000 - $5,000,000
- $5,000,000 - $10,000,000
- $10,000,000 - $50,000,000
## Job Placements - 1 Year After Leaving Institution

*(Zolas et. al. Science, Dec. 2015)*

<table>
<thead>
<tr>
<th>Locale and small</th>
<th>Industry</th>
<th>Academia</th>
<th>Government</th>
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<tr>
<td></td>
<td>R&amp;D firms</td>
<td>Non-R&amp;D firms</td>
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<tr>
<td>Placed within sector</td>
<td>17.0</td>
<td>21.7</td>
<td>57.1</td>
<td>100.0</td>
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<td>National sample (M)</td>
<td>10.8</td>
<td>75.0</td>
<td>10.7</td>
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<tr>
<td>Of those in sector,</td>
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<tr>
<td>percent placed:</td>
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<tr>
<td>Within 50 miles</td>
<td>10.1</td>
<td>23.5</td>
<td>8.9</td>
<td>18.2</td>
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<td>Within state</td>
<td>16.6</td>
<td>36.0</td>
<td>18.0</td>
<td>25.8</td>
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</table>
Descriptive outcomes by field
(Zolas et. al. Science, Dec. 2015)

Fig. 3. The annual earnings and placement of doctoral recipients supported by grants vary by field. Young firms are defined to be those <5 years old. High-payroll per worker establishments are defined as those with a payroll per worker above the median for the establishments within their six-digit industry. Means and standard errors (error bars) for each variable.
21st Century Economic Statistics

Data Providers
- Businesses
- Households
- Organizations

Non Survey Data Providers
- Federal & State Admin Data
- Other data

Third Party Intermediaries:
- Data Brokers
- Universities
- Transaction Processors

Stat Agencies
- Survey estimates
- Computed statistics (e.g., GDP)
- Reports / Analysis

Data Users
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CIPSEA, Title 13
Conclusions

- UMETRICS data combined with Census data provides a source of information for studying innovation and the impacts of federal research spending.
- Project illustrates benefits of systematic integration of transaction, administrative and survey data.
- Questions:
  - Can the stat agencies secure access to similar data for additional sectors?
  - If so, can the methods be scaled?