

# R: Innovating at the Bureau of Labor Statistics

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Economist

Division of Consumer Expenditure Surveys

Federal Committee on Statistical Methodology

March 2018



# Overview

- **IPP:** Division of International Prices
- **PPI:** Division of Industrial Prices and Price Indexes
- **CE:** Division of Consumer Expenditure Survey
- **OCWC:** Office of Compensation and Working Conditions
- **OSMR:** Office of Survey Methods and Research



# Overview

- Automation (IPP)
- Quality control (PPI)
- Real-time response rates (OCWC)
- Data visualization (CE)
- Other R Shiny applications
- R packages



# R Shiny Applications



# Sample Refinement Automation

- International Prices Program
  - ▶ Receive data from Census and Customs
  - ▶ Must verify Establishment ID Number (EIN), name, and address to provide to field economists
  - ▶ 1700 export collections units per sample
  - ▶ 2400 import collection units per sample
  - ▶ 6 IPP sample team members
  - ▶ 16 copies, 20 pastes, and 46 clicks per unit

# Data Sources

**Access secure data portal** U.S. Customs and Border Protection

**NOTICE TO ALL USERS REGARDING**  
You are about to access a Department of Homeland Security computer system. This computer system and data therein are property of the U.S. Government and provided for official U.S. Government information and use. There is no expectation of privacy when you use this computer system. The use of a password or any other security measure does not establish an expectation of privacy. By using this system, you consent to the terms set forth in this notice. You may not possess classified national security information on this computer system. Access to this system is restricted to authorized users only. Unauthorized access, use, or modification of the system or of data contained therein, or in transit to/from this system, may constitute a violation of section 1820 of title 18 of the U.S. Code and other criminal laws. Anyone who accesses a Federal computer system without authorization or exceeds authorized access, in violation of section 1820 of title 18 of the U.S. Code and other criminal laws, or who knowingly provides or attempts to provide unauthorized access to such a system, is subject to penalties, fines or imprisonment. This computer system and any related equipment is subject to searching for administrative oversight, law enforcement, criminal investigative purposes, input for anti-doping monitoring or analysis, and to ensure proper performance of applicable security, hardware and procedures. Such may conduct searching activities without further notice.

**NOTICE TO ALL USERS REGARDING**  
By logging in to the ACE Portal, you agree to be bound by the language set forth in the [Terms and Conditions](#) document, published on May 16, 2007, last updated on July 7, 2008.  
It is mandatory that all ACE users maintain a current email address within their ACE user profile.

Log in Information  
Enter your ACE UserID and Password to log in:

UserID:   
Password:

[Forgot Your Password?](#)

If you need assistance with the portal, please contact the CBP Technology Support Center at 1-866-530-4177 for Trade and PUA users, or 1-800-827-8770 for CBP personnel.

Please note that after some time of inactivity, the system will log you off automatically and ask you to log in again.

## LDB Extract System

Home | Extract Data | Four-Quarter Extract | Help

Robert Sutton  
Logout

▶ [Saved Queries](#)

[View Status of Running Queries](#)

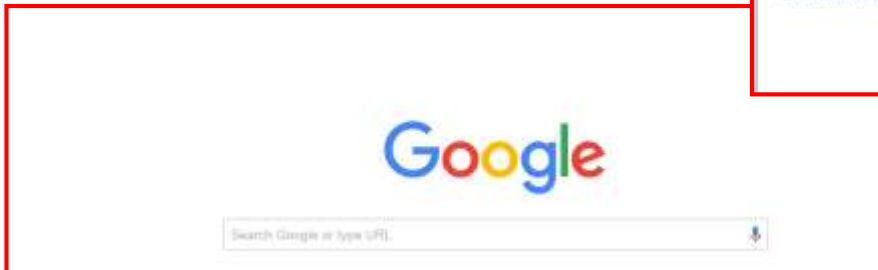
Please let us know if you have questions about the LDB or if we can assist in any way. Help requests should be submitted via the "ask a question" button on the LDB Central Intranet ([http://www.bls.gov/helpdesk/ask\\_a\\_question/](#)). Select "Program and Application Specific" under General Types. Select "Quarterly Census of Employment and Wages (QCEW)" under Program and Application Specific section. Select "Longitudinal Database (LDB)" sub-category. Provide your Problem Description, Attachments (if any), and User Importance/Impact and click the "Submit" button. Comments, questions, or concerns about the LDB can be submitted directly via e-mail to [LDB\\_Commson](mailto:LDB_Commson).

### LDB News

- The Division of Business Establishment Systems has updated the Longitudinal Database (LDB) with data for the third quarter of 2016, and the data are now available to users. The LDB presently contains data from the first quarter of 1990 through the third quarter of 2016. For all states. With this quarter's load, back-quarter corrections were applied for 2016:1 and 2016:2.

We anticipate that data for the next several quarters will be available according to the following tentative schedule:

**Data Through Date Available**  
Q4 2016 week of 12/13



Google

Search Google or type URL



Enter a Collection Unit and Sample

Collection Unit (last 4 digits):

1

0345

Sample:

M43

Company Name (edited):

2

XXXXXX

Corp Div:

33142-000

Street:

YYYYYYYYYYYYYYYYYY

Search in New Tab

5

Open SOS Website

Create Future Note

Sampled Company EIN Spreadsheet ACE LDB Progress Report Help

| CORP_DIV  | EIN        | COMPANY_NAME | ADDRESS_1          | CITY_      | STATE_ | ZIP_CODE_10 | IPP_history |
|-----------|------------|--------------|--------------------|------------|--------|-------------|-------------|
| 33142-000 | 0000000000 | XXXXXXXXXX   | YYYYYYYYYYYYYYYYYY | HUNTSVILLE | AL     | 358062807   | old company |

ACE: matching on sampled EIN

3

| Entry.Date | Importer.No. | Importer.Name | Mailing.Line.1     | M.City     | M.St | M.Zip      | Physical.Street | P.City | P.St | P.Zip |
|------------|--------------|---------------|--------------------|------------|------|------------|-----------------|--------|------|-------|
| 2016-12-06 | 00-000000000 | XXXXXXXXXX    | YYYYYYYYYYYYYYYYYY | HUNTSVILLE | AL   | 35806-2807 | same            |        |      |       |

RTS Master Listing: matching on Name, Corp Div, or Street displayed on the left

Show 100 entries

Search:

4

| RTS_ID    | COMPANY_NAME | DIVISION_NAME | STREET_            | CITY_STATE_ZIP          | SOURCE_          |
|-----------|--------------|---------------|--------------------|-------------------------|------------------|
| All       | All          | All           | All                | All                     | All              |
| 33142-000 | XXXXXX       |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 35806     | address_init     |
| 33142-000 | XXXXXX       |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 35806     | sampling_unit    |
| 33142-000 | XXXXXX       |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 358062807 | address_init     |
| 33142-000 | XXXXXX       |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 358062807 | sampling_unit    |
| 33142-000 | XXXXXXXXXX   |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 35806     | sampling_unit    |
| 33142-000 | XXXXXXXXXX   |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 35806     | old_reporter     |
| 33142-000 | XXXXXXXXXX   |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 358062807 | address_init     |
| 33142-000 | XXXXXXXXXX   |               | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 358062807 | sampling_unit    |
| 33142-000 | XXXXXXXXXX   |               | Y.YYYYYYYYYYY      | HUNTSVILLE AL 358062807 | CURRENT_REPORTER |
| 33142-000 | XXXXXXXXXX   | /             | YYYYYYYYYYYYYYYYYY | HUNTSVILLE AL 35806     | address_init     |

Showing 1 to 10 of 10 entries

Previous 1 Next

## Enter a Collection Unit and Sample

Collection Unit (last 4 digits):

Sample:

Company Name (edited):

Corp Div:

Street:

[Search in New Tab](#)

[Open Google Maps](#)

[Open SOS Website](#)

[Create Future Note](#)

# Left Side





# Right Side

|                 |     |              |           |       |        |             |             |                 |     |     |                 |      |
|-----------------|-----|--------------|-----------|-------|--------|-------------|-------------|-----------------|-----|-----|-----------------|------|
| Sampled Company |     |              |           |       |        |             |             | EIN Spreadsheet | ACE | LDB | Progress Report | Help |
| CORP_DIV        | EIN | COMPANY_NAME | ADDRESS_1 | CITY_ | STATE_ | ZIP_CODE_10 | IPP_history |                 |     |     |                 |      |

ACE: matching on sampled EIN

|            |              |               |                |        |      |       |                 |        |      |       |
|------------|--------------|---------------|----------------|--------|------|-------|-----------------|--------|------|-------|
| Entry.Date | Importer.No. | Importer.Name | Mailing.Line.1 | M.City | M.St | M.Zip | Physical.Street | P.City | P.St | P.Zip |
|------------|--------------|---------------|----------------|--------|------|-------|-----------------|--------|------|-------|

RTS Master Listing: matching on Name, Corp Div, or Street displayed on the left



# Search Results

Enter a Collection Unit and Sample

Collection Unit (last 4 digits):

Sample:

Company Name (edited):

Corp Div:

Street:

[G Search in New Tab](#)

[Q Open SOS Website](#)

[+ Create Future Note](#)

---

Company Name Changes

No company name changes in the reporter or old\_co\_name\_fsn tables for Corp Div: 33142-000

Google Search: company name, city, and state

Search Images Maps Play YouTube News Gmail News More

[All](#) [Images](#) [Videos](#) [News](#) [Shopping](#) [Maps](#) [Books](#)

---

0 results

**Any time**  
Past hour  
Past 24 hours  
Past week  
Past month  
Past year

**All results**  
Verbata

**Carrabba's Italian Grill in Huntsville, AL**  
<https://www.carrabbas.com/locations/al/huntsville> +  
Looking for a great Italian restaurant? Bring your family and friends to the Carrabba's Italian Grill location in Huntsville today and enjoy classic Italian dishes!

**Ralphie May :: Stand Up Live Huntsville**  
[standuplivehuntsville.laughstube.com/event.cfm?id=476375](http://standuplivehuntsville.laughstube.com/event.cfm?id=476375) +  
Ralphie May :: Stand Up Live Huntsville ... Stand Up Live Huntsville, Huntsville, AL. Two item minimum ... to show time. Please call the Box Office at xxx.xxx.xxxx ...

**Josh Blue :: Stand Up Live Huntsville**  
[standuplivehuntsville.laughstube.com/event.cfm?id=476363](http://standuplivehuntsville.laughstube.com/event.cfm?id=476363) +  
Josh Blue :: Stand Up Live Huntsville ... Stand Up Live Huntsville, Huntsville, AL. Two item minimum, 19 & ... to show time. Please call the Box Office at xxx.xxx.xxxx ...

**Kountry Wayne :: Stand Up Live Huntsville**  
[standuplivehuntsville.laughstube.com/event.cfm?id=480893](http://standuplivehuntsville.laughstube.com/event.cfm?id=480893) +  
Kountry Wayne :: Stand Up Live Huntsville ... April 09, 2017 6:30 PM. Stand Up Live Huntsville, Huntsville, AL ... Please call the Box Office at xxx.xxx.xxxx ...

**Chingo Bling :: Stand Up Live Huntsville**  
[standuplivehuntsville.laughstube.com/event.cfm?id=481551](http://standuplivehuntsville.laughstube.com/event.cfm?id=481551) +  
Chingo Bling :: Stand Up Live Huntsville ... Stand Up Live Huntsville, Huntsville, AL. Two item minimum ... to show time. Please call the Box Office at xxx.xxx.xxxx ...

Searches related to **XXXXXXXX YYYYYYYYYYYYYYYYYY HUNTSVILLE AL 35806**

|  |   |
|--|---|
| <a href="#">carrabba's huntsville al coupons</a>             | <a href="#">stand up live huntsville menu</a>     |
| <a href="#">carrabba's italian grill huntsville al 35801</a> | <a href="#">italian restaurants huntsville al</a> |
| <a href="#">carrabba's parkway place mall</a>                | <a href="#">outback huntsville al</a>             |
| <a href="#">bonefish grill huntsville alabama</a>            | <a href="#">stand up live huntsville al menu</a>  |

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# Export Addresses at a Glance

Enter a Collection Unit and Sample

Collection Unit (last 4 digits):

Sample:

Company Name (edited):

Corp Div:

Street:

Sampled Company EIN Spreadsheet ACE LDB Progress Report Help

EIN Spreadsheet: matching on sampled EIN

| pct | export_id | eistrata | name | address | city | st | zip | eistrecs | addrcs | split | flag1 | flag2 | problem | Mike.s.Comment |
|-----|-----------|----------|------|---------|------|----|-----|----------|--------|-------|-------|-------|---------|----------------|
| 33% |           |          |      |         |      |    |     | 2398     | 800    | 1     | 1     |       |         |                |
| 21% |           |          |      |         |      |    |     | 2398     | 510    |       |       |       |         |                |
| 11% |           |          |      |         |      |    |     | 2398     | 260    |       |       |       |         |                |
| 7%  |           |          |      |         |      |    |     | 2398     | 177    |       |       |       |         |                |
| 5%  |           |          |      |         |      |    |     | 2398     | 127    |       |       |       |         |                |
| 4%  |           |          |      |         |      |    |     | 2398     | 93     |       |       |       |         |                |
| 3%  |           |          |      |         |      |    |     | 2398     | 82     |       |       |       |         |                |



# Benefits of Automation

- 80-100 hours per sample of time savings
  - ▶ Much less clicking
  - ▶ Better and more thorough sample review
  - ▶ More time to review more problematic collection units

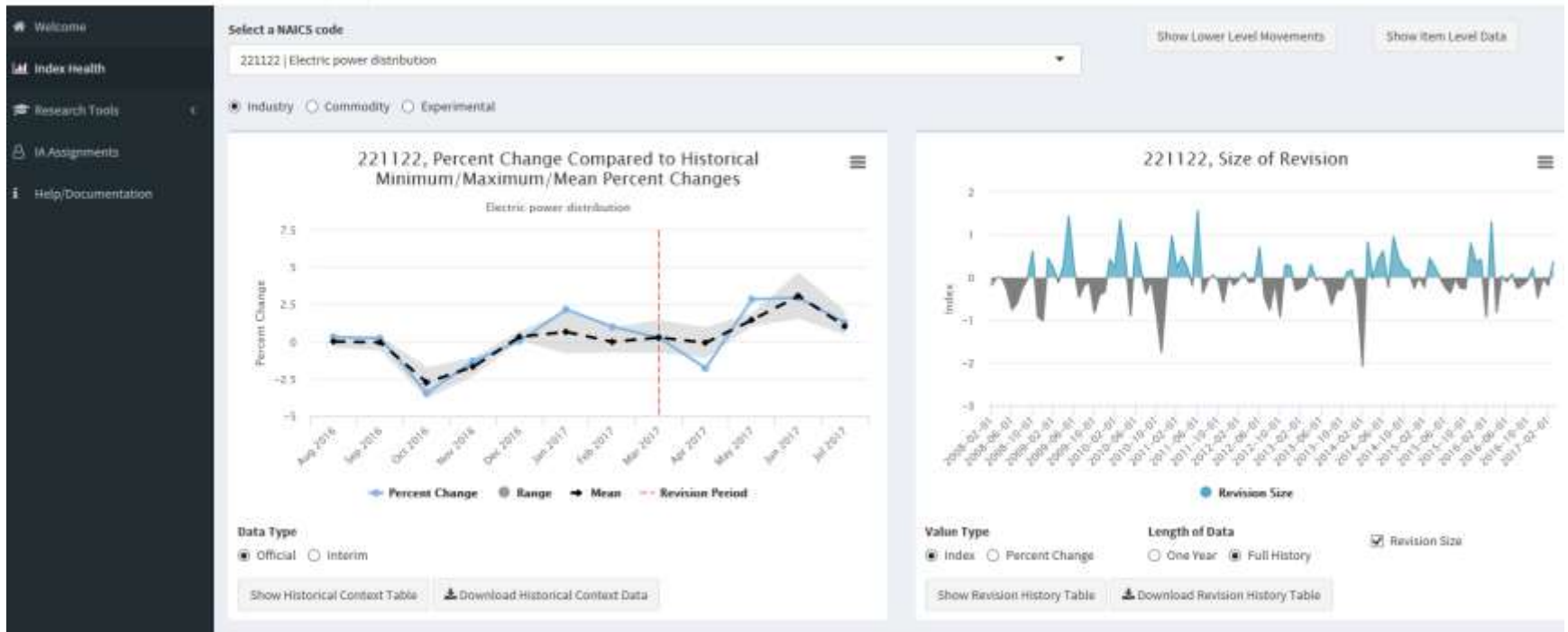
# Sample Refinement Automation

- Ara Khatchadourian:  
[khatchadourian.ara@bls.gov](mailto:khatchadourian.ara@bls.gov)
- Rob Sutton: [sutton.robert@bls.gov](mailto:sutton.robert@bls.gov)

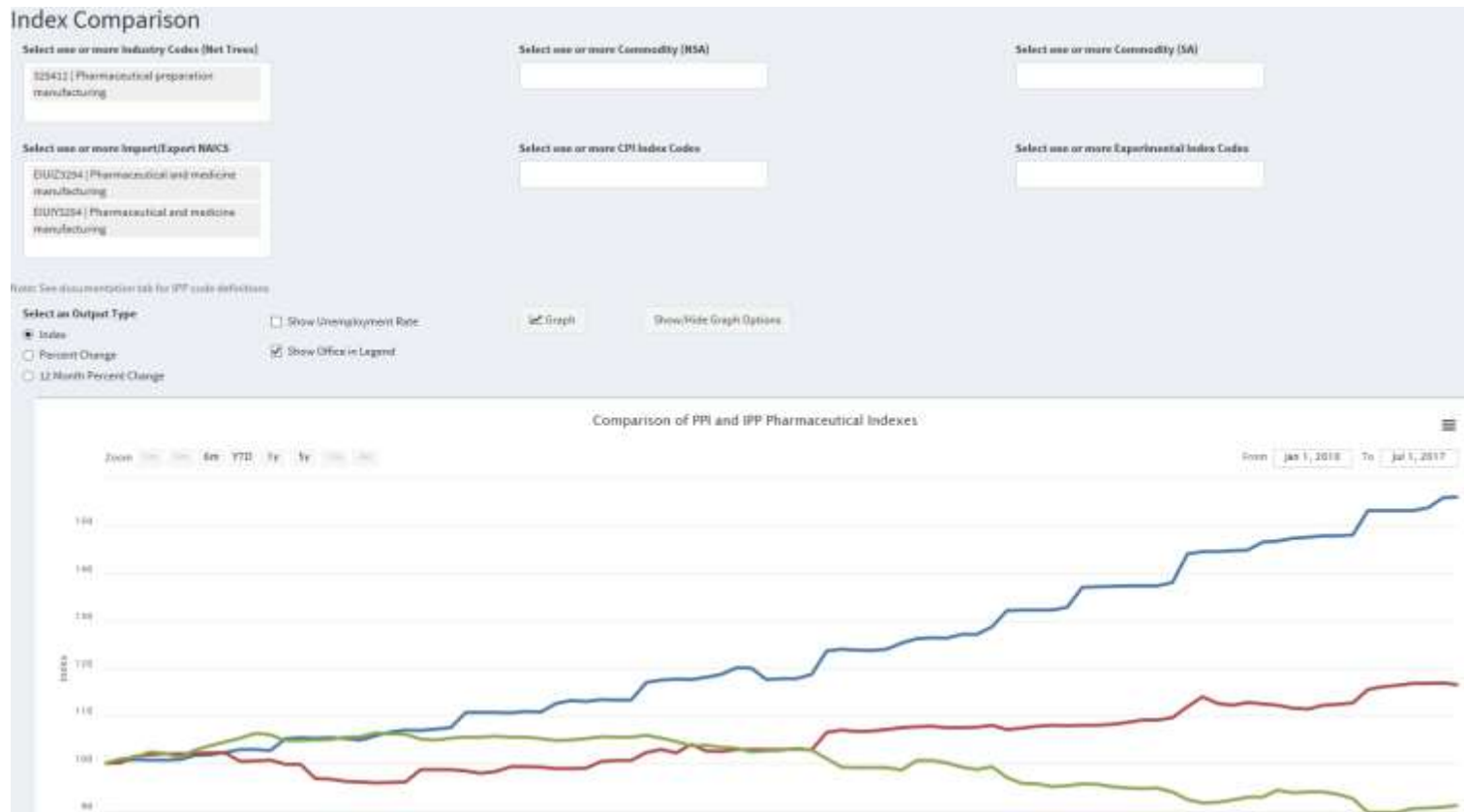


# Industrial Prices Visualization Dashboard

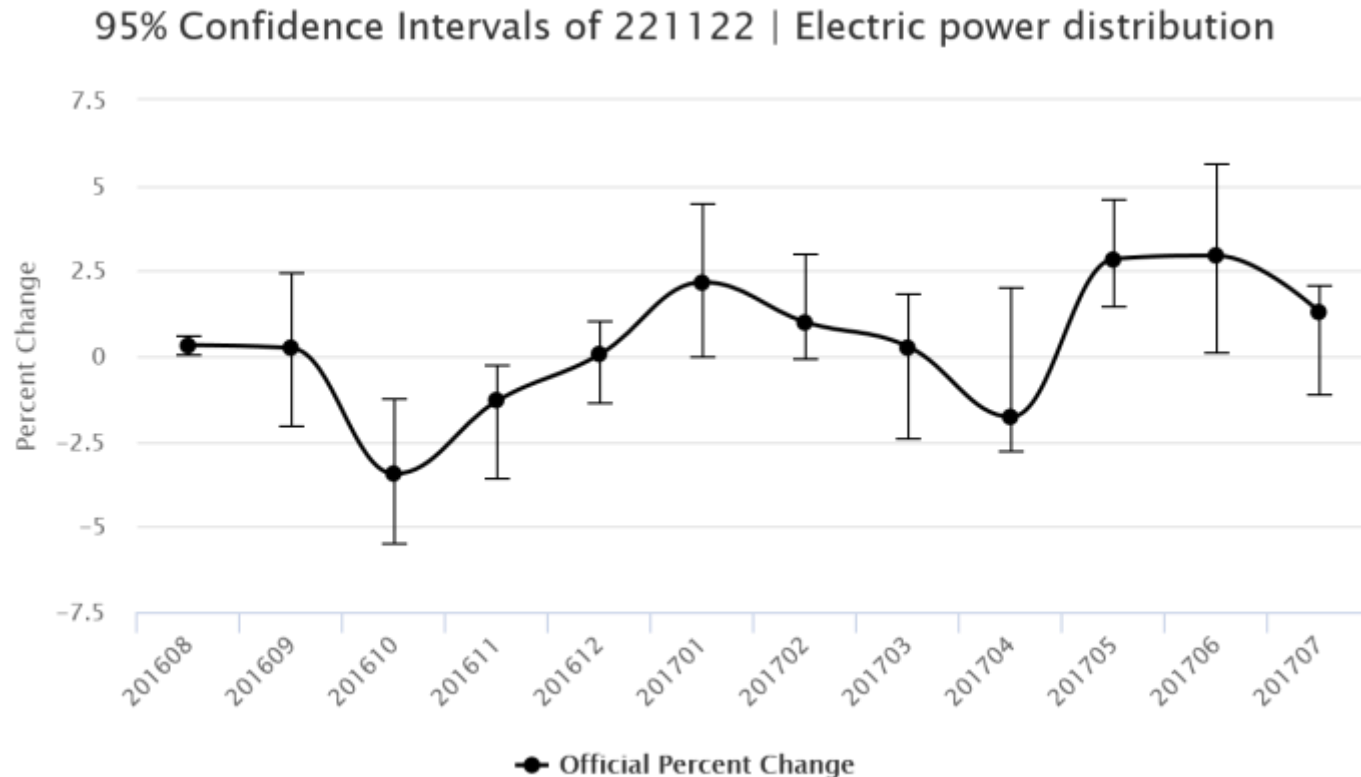
PPI Visualization Dashboard 3.02



# Index Comparisons



# Index Review and Revision



EMBARGOED DATA - NOT FOR PUBLIC RELEASE

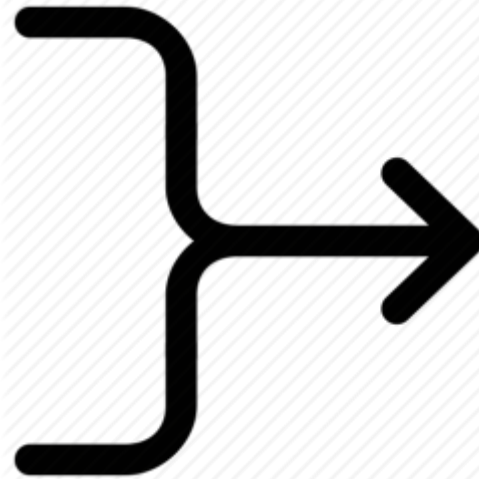


# Visualization Dashboard

- Neil Wagner: [wagner.neil@bls.gov](mailto:wagner.neil@bls.gov)
- Steve York: [york.stephen@bls.gov](mailto:york.stephen@bls.gov)



# Interactive CE Visualization Tool



| NewID       | Member No. | Income |
|-------------|------------|--------|
| <b>MEMI</b> |            |        |

| NewID       | Race | Expenditure |
|-------------|------|-------------|
| <b>FMLI</b> |      |             |

| NewID       | Sequence | Allocation |
|-------------|----------|------------|
| <b>EXPN</b> |          |            |

| UCC         | Cost |
|-------------|------|
| <b>MTBI</b> |      |

# CE Public-Use Microdata (PUMD)

## ■ Public-Use Microdata

- ▶ Family-level characteristics
- ▶ Expenditures by Universal Classification Code (UCC)
- ▶ Member-level characteristics
- ▶ Expenditures and their characteristics by type of expenditure (EXPN... > 50 files each year!)
- ▶ And more!

# Files Required for Analysis

## Family Characteristics File (34,177 Observations)

|    | newid    | cutenure | fam_size  | finlart21 | ref_race                  | region    | finobtxm           | high_edu              |
|----|----------|----------|-----------|-----------|---------------------------|-----------|--------------------|-----------------------|
| 1  | 02792005 | Owner    | 1         | 16991.669 | Black or African American | South     | Second 20 Percent  | High School Graduate  |
| 2  | 02792065 | Renter   | 1         | 14256.350 | White                     | West      | Third 20 Percent   | Some College or Assoc |
| 3  | 02792075 | Renter   | 3         | 16964.084 | White                     | South     | Second 20 Percent  | Some College or Assoc |
| 4  | 02792095 | Owner    | 1         | 21831.304 | White                     | South     | Third 20 Percent   | Less than High school |
| 5  | 02792115 | Renter   | 4         | 18482.601 | Asian                     | Northeast | Third 20 Percent   | Bachelor's Degree     |
| 6  | 02792125 | Renter   | 3         | 14680.459 | White                     | Northeast | Lowest 20 Percent  | Some College or Assoc |
| 7  | 02792155 | Owner    | 1         | 6143.497  | Asian                     | West      | Fourth 20 Percent  | Post-graduate Degree  |
| 8  | 02792225 | Owner    | 1         | 13793.790 | White                     | South     | Lowest 20 Percent  | Some College or Assoc |
| 9  | 02792245 | Renter   | 4         | 18926.631 | White                     | West      | Third 20 Percent   | Some College or Assoc |
| 10 | 02792265 | Renter   | 2         | 15954.534 | Asian                     | West      | Second 20 Percent  | High School Graduate  |
| 11 | 02792275 | Owner    | 2         | 10781.501 | Black or African American | South     | Third 20 Percent   | Bachelor's Degree     |
| 12 | 02792295 | Renter   | 2         | 17750.726 | Asian                     | South     | Fourth 20 Percent  | Bachelor's Degree     |
| 13 | 02792335 | Owner    | 5 or More | 18636.435 | White                     | South     | Second 20 Percent  | Less than High school |
| 14 | 02792385 | Renter   | 1         | 17653.513 | Black or African American | South     | Fourth 20 Percent  | Some College or Assoc |
| 15 | 02792415 | Owner    | 2         | 18687.147 | White                     | Northeast | Third 20 Percent   | Some College or Assoc |
| 16 | 02792435 | Owner    | 1         | 6171.729  | Asian                     | West      | Third 20 Percent   | Bachelor's Degree     |
| 17 | 02792455 | Renter   | 1         | 12064.521 | White                     | Northeast | Lowest 20 Percent  | High School Graduate  |
| 18 | 02792525 | Owner    | 2         | 18876.791 | Asian                     | West      | Highest 20 Percent | Post-graduate Degree  |
| 19 | 02792585 | Renter   | 5 or More | 23060.929 | Black or African American | Midwest   | Third 20 Percent   | Some College or Assoc |
| 20 | 02792595 | Owner    | 3         | 19092.108 | Asian                     | West      | Highest 20 Percent | Bachelor's Degree     |

## Expenditures File (1,720,755 Observations)

|    | newid    | ref_mo | ucc    | cost      |
|----|----------|--------|--------|-----------|
| 1  | 02792065 | 01     | 210110 | 650.0000  |
| 2  | 02792075 | 01     | 210110 | 258.3333  |
| 3  | 02792115 | 01     | 210110 | 1370.0000 |
| 4  | 02792125 | 01     | 210110 | 426.0000  |
| 5  | 02792245 | 01     | 210110 | 3189.0000 |
| 6  | 02792265 | 01     | 210110 | 380.0000  |
| 7  | 02792295 | 01     | 210110 | 918.3333  |
| 8  | 02792385 | 01     | 210110 | 675.0000  |
| 9  | 02792455 | 01     | 210110 | 850.0000  |
| 10 | 02792585 | 01     | 210110 | 1500.0000 |
| 11 | 02792815 | 01     | 210110 | 880.0000  |
| 12 | 02793085 | 01     | 210110 | 1050.0000 |
| 13 | 02793345 | 01     | 210110 | 850.0000  |
| 14 | 02793355 | 01     | 210110 | 816.0000  |
| 15 | 02793455 | 01     | 210110 | 419.0000  |
| 16 | 02793525 | 01     | 210110 | 146.0000  |
| 17 | 02793645 | 01     | 210110 | 475.0000  |
| 18 | 02793775 | 01     | 210110 | 800.0000  |
| 19 | 02793805 | 01     | 210110 | 860.0000  |
| 20 | 02793815 | 01     | 210110 | 800.0000  |
| 21 | 02794175 | 01     | 210110 | 196.0000  |



# Required Resources / Skills

```
135 ~ #####
136 #
137 #           Compute Annual Mean Estimates
138 #
139 ~ #####
140
141 # Merge Interview CU weights and expenditures
142 int_df <- left_join(
143   fmli,
144   expend %>% filter(ucc %in% getUCCs(expenditure, stub)) %>%
145     group_by(newid) %>% summarise(cost = sum(cost)),
146   by = "newid"
147 ) %>%
148   mutate_each_(
149     funs(replace(., is.na(.), 0)),
150     vars = c("cost", paste0("wtrep", str_pad(1:44, 2, "left", 0)))
151   )
152
153 # Compute an Interview annual mean estimate
154 int_gm <- int_df %>%
155   mutate(wt_cost = cost * finlwt21) %>%
156   summarise(
157     grand_mean = sum(wt_cost, na.rm = TRUE) / sum(calwt)
158   ) %>% unlist() %>% unname()
159
160 # Merge Diary CU weights and expenditures
161 dia_df <- left_join(
162   fmid,
163   expend %>% filter(ucc %in% getUCCs(expenditure, stub)) %>%
164     group_by(newid) %>% summarise(cost = sum(cost)),
165   by = "newid"
166 ) %>%
167   mutate_each_(
168     funs(replace(., is.na(.), 0)),
169     vars = c("cost", paste0("wtrep", str_pad(1:44, 2, "left", 0)))
170   )
171
172 # Compute a Diary annual mean estimate
173 dia_gm <- dia_df %>%
174   mutate(wt_cost = cost * finlwt21) %>%
175   summarise(grand_mean = sum(wt_cost, na.rm = TRUE) / sum(popwt)) %>%
176   unlist() %>% unname()
177
```



# Interactive CE Visualization Tool



Introduction

CE Visualization

Methods

## Introduction: Comparisons of reported expenditures

The **Consumer Expenditure Survey (CE)** program consists of two surveys, the Interview and Diary surveys, which collect data on household expenditures, income, and consumer unit (families and single consumers) characteristics. The survey covers all U.S. consumer units (CUs), which we also refer to as households or families.

This application is intended to provide the user an introduction to CE data through an interactive visualization tool. An accompanying table showing comparisons of expenditures between a selected subsample of the (

Click on the **CE Visualization** tab above to use the application



# Interactive CE Visualization Tool

## Interactive CE Visualization Tool - 2015 Data

**1**

**Demographic Categories**

- Region
- Number of people in CU
- Home Owner / Renter
- CU income range
- Highest level of education in the CU
- Race of the reference person

**2**

**Subcategories**

**Region**  
Midwest

**CU income range**  
Lowest 20 Percent

**Race of the reference person**  
Asian

submit

**3**

**Options**

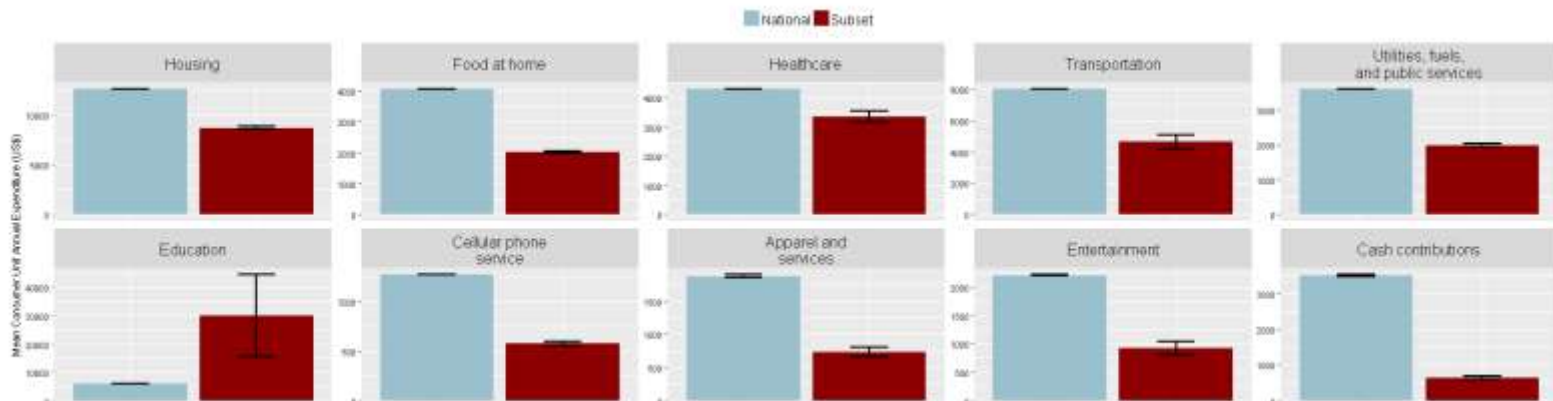
Independent scales

Download Table

**4**

Number of households in your sample

28



# Interactive CE Visualization Tool

|   |          |
|---|----------|
| <p><b>Demographic Categories</b></p> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Region</li><li><input type="checkbox"/> Number of people in CU</li><li><input type="checkbox"/> Home Owner / Renter</li><li><input checked="" type="checkbox"/> CU income range</li><li><input type="checkbox"/> Highest level of education in the CU</li><li><input checked="" type="checkbox"/> Race of the reference person</li></ul> | <b>1</b> |
|---|----------|





# Interactive CE Visualization Tool

**Subcategories** 2

**Region**

Midwest ▼

**CU income rage**

Lowest 20 Percent ▼

**Race of the reference person**

Asian ▲

White

Black or African American

American Indian or Alaskan Native

Asian

Native Hawaiian or Other Pacific Islander


Multi-race



# Interactive CE Visualization Tool

**Options** **3**

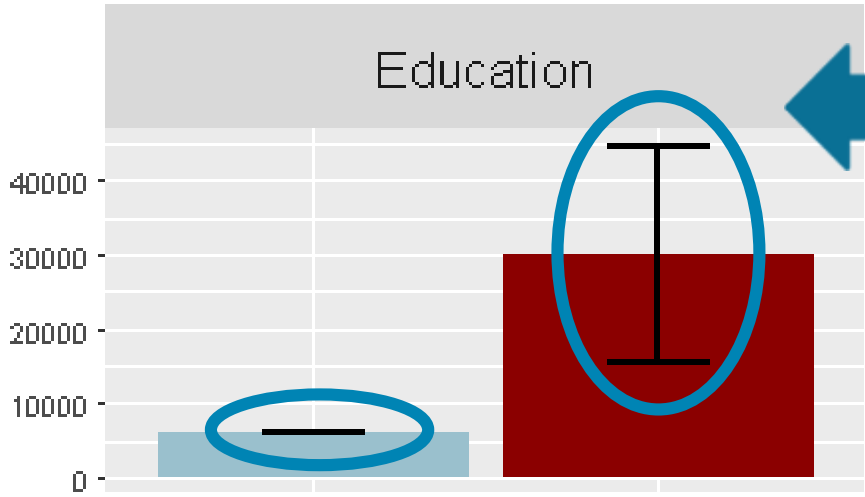
Independent scales

 Download Table

Number of households in your sample: **4**

**28**

# Interactive CE Visualization Tool



**Error Bars**

**Mean = \$30,040.00**

**CV = 24.12%**

**Sample Size = 3**

**Lower Bound = \$15,548.70**

**Upper Bound = \$44,531.30**

| Sample   | Expenditure | Cost     | CV (%) | Lower Bound | Upper Bound | Sample Size |
|----------|-------------|----------|--------|-------------|-------------|-------------|
| Subset   | Education   | 30040.00 | 24.12  | 15548.70    | 44531.30    | 3           |
| National | Education   | 5946.81  | 0.64   | 5870.69     | 6022.93     | 4024        |



# Benefits to the user

- Accessibility: The user can access the app for **free** as long as they have internet access on a device with a web browser
- Usability: The user operates only the clean, user-friendly UI to get data, results, and visualizations



# Interactive CE Visualization Tool

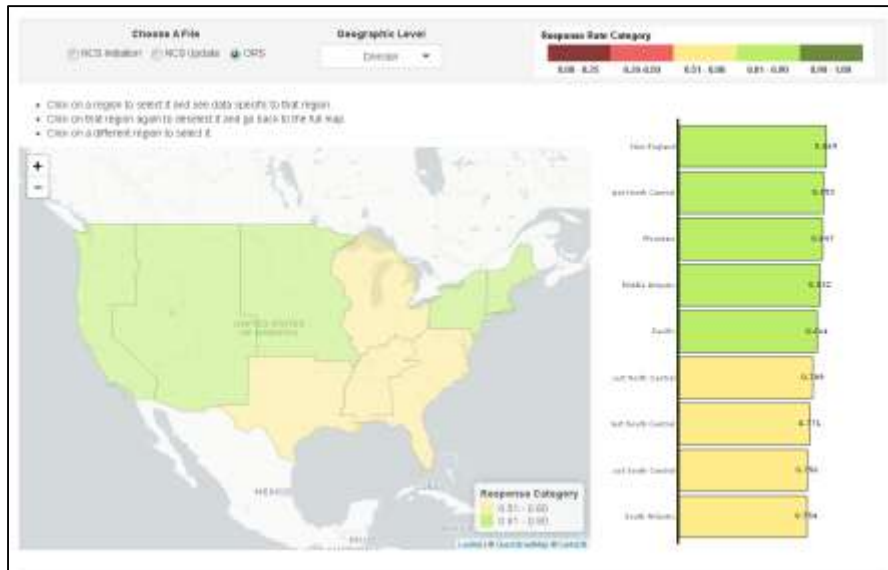
- Arcenis Rojas: [rojas.arcenis@bls.gov](mailto:rojas.arcenis@bls.gov)



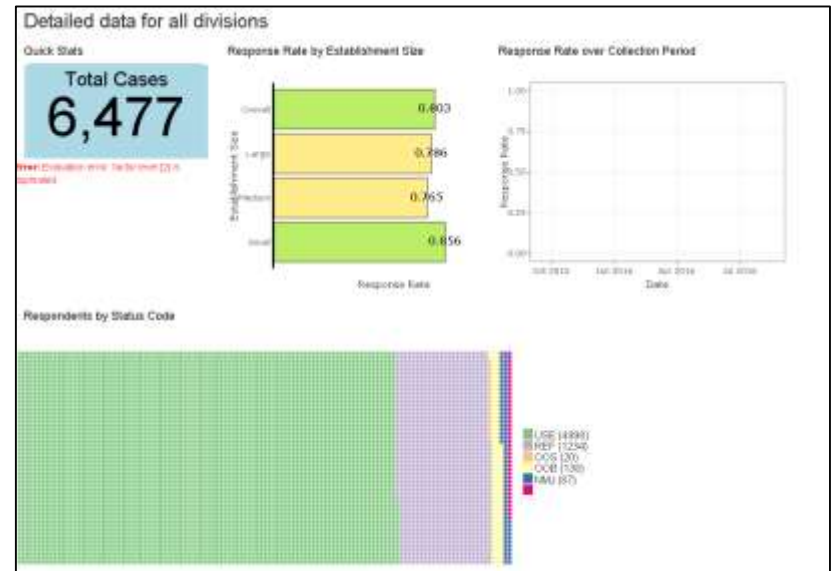
# Real-time Response Rate Tool

- Office of Compensation and Working Conditions
- Provide real-time response rates to field offices
  - ▶ Focus on problem collection areas
  - ▶ Improved sample representativity

# Real-time Response Rate Tool



Detailed summaries for each region



Response rates by region and/or establishment size



# Real-time Response Rate Tool

- Brandon Kopp (OSMR):  
[kopp.brandon@bls.gov](mailto:kopp.brandon@bls.gov)
- Randall Powers (OSMR):  
[powers.randall@bls.gov](mailto:powers.randall@bls.gov)
- Arcenis Rojas (CE):  
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# Other Shiny Applications

- Choropleth maps of unemployment data (OSMR)
- Energy Information Administration analyzer (PPI)
- Text analysis Shiny App (Survey Methods)

# R Packages



# R Packages

- **rpms**: Recursive Partitioning for Modeling Survey Data package (Survey Methods)
- **growfunctions**: Bayesian Non-Parametric Dependent Models for Time-Indexed Functional Data package (Survey Methods)



# rpms

- Fits a linear model to survey data in each node obtained by recursively partitioning the data.
- Adjusts for complex sample design features used to obtain the data.
- Produces design-consistent coefficients to the least squares linear model between the dependent and independent variables.

# rpms

- The main function returns the resulting binary tree with the linear model fit at every end-node.
- Daniell Toth (OSMR): [toth.daniell@bls.gov](mailto:toth.daniell@bls.gov)



# growfunctions

- Bayesian Non-Parametric Dependent Models for Time-Indexed Functional Data package (Survey Methods)
- Estimates a collection of time-indexed functions under either of Gaussian process (GP) or intrinsic Gaussian Markov random field (iGMRF) prior formulations

# growfunctions

- Dirichlet process mixture allows sub-groupings of the functions to share the same covariance or precision parameters
- The GP and iGMRF formulations both support any number of additive covariance or precision terms, respectively, expressing either or both of multiple trend and seasonality.

# growfunctions

- Terrance Savitsky (OSMR):  
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# Challenges



# Challenges

- Data confidentiality
- Need for an R server to make apps/programs public
- Can only put Shiny apps on a webpage via iFrames or setting up an account on a cloud server (i.e., Digital Ocean, R Studio)



# Contact Information

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