Web Scraping and BLS

Federal Committee on Statistical Methodology
Research Conference March 7, 2018

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Overview

- Background
- Experiences at BLS
- Challenges
- Next Steps

Data Collection Challenges

- Reluctant respondent
  - Burden
  - Trust
- Data Collection
  - Costly to support entire infrastructure

Data Collection Challenges

- Called to automate our data collection

How BLS has Addressed Data Collection Challenges

- Purchased data sets
- Other Federal surveys
- Directly from corporation
- Scraping websites

Data Collection Opportunity

- Information on the internet
- Anything, well almost anything, we collect manually could be collected automatically

Web Scraping

Web scraping is the process of extracting data from websites, typically through the use of a software program that simulates human exploration of a website(s).

Getting Web Data

- Web scraping etc…
  - Extract data (prices) from web page (HTML)
    - Human readable page -> machine readable data
  - Using APIs (Application Programming Interfaces)
    - Code (provided by source) get machine readable data directly
- Next step--data-traffic efficient applications

Web Scrape Benefits

- Reduces collection costs
- Reduces respondent burden
- Improves timeliness
- Increases sample size
- Increases data quality
- Allows for evaluation & improvement

Web Scraping

- In the beginning …
  - Obtain price and characteristic data for hedonic modeling
  - Evaluate as a replacement for data collection

Web Scraping

- Then there were multiple efforts…
  - Retailer web sites, web scraping & API
  - Price aggregators
  - Obtain data from other statistical agencies
  - Location services to refine address information
  - Job postings & The Conference Board

Web Scraping Successes

- Fatal Work Injuries & Google Alerts
- Office of Productivity & Technology & Federal Agencies
- Prices

Census of Fatal Occupational Injuries (CFOI)

- Fatal Work Injuries & Google Alerts
  - Google Alerts
  - Developed CFOI Public Data Management System (C-PDMS)
  - C-PDMS is being used by for CFOI production purposes.

Office Of Productivity & Technology (OPT)

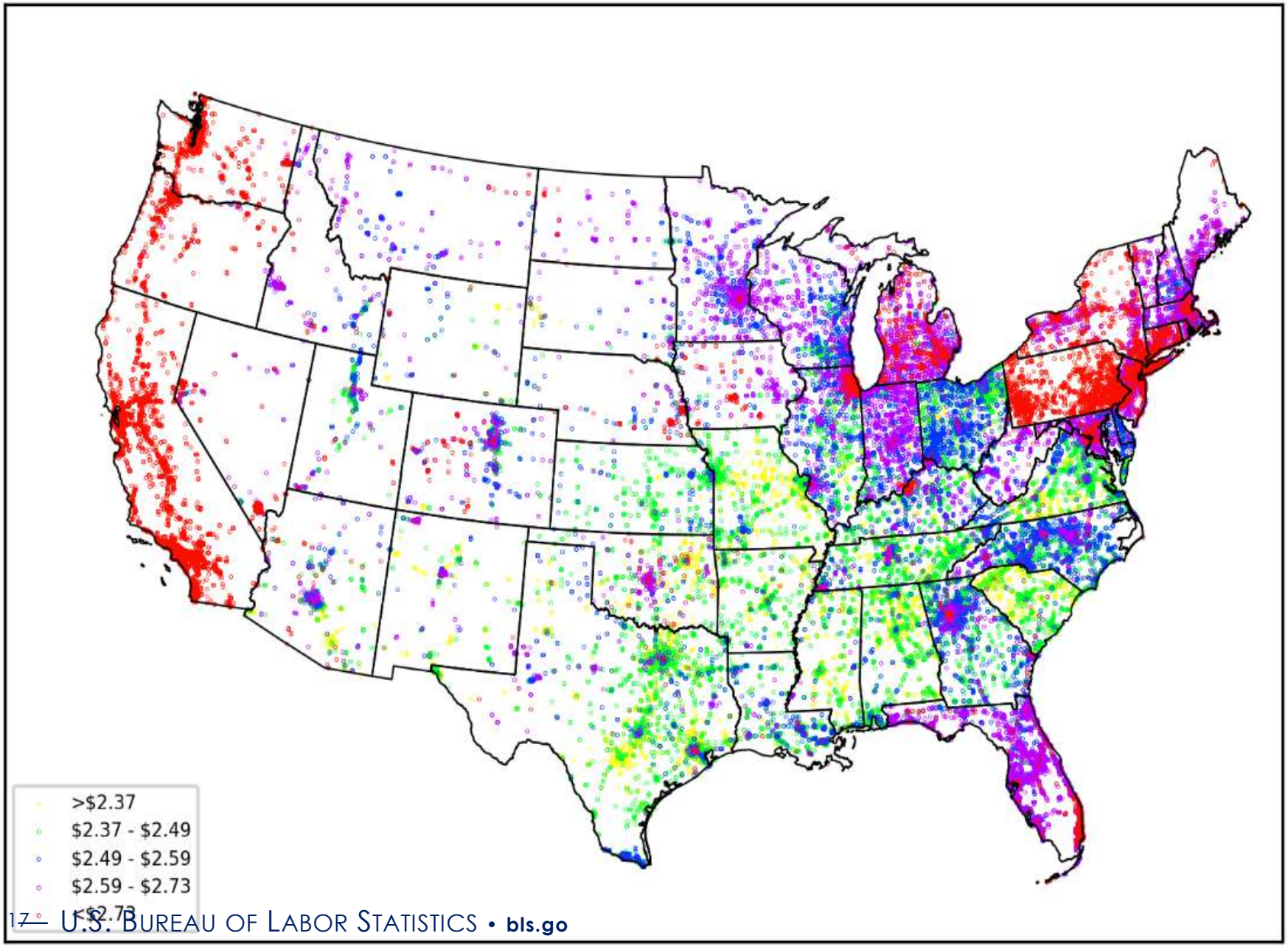
- Web Scrape Throughout OPT
  - Multifactor Productivity
    - 40% of the input data in non-manufacturing & manufacturing
    - Bureau of Economic Analysis (BEA)
  - Industry Productivity
    - United States Geological Survey (USGS)
    - & Center Disease Control (CDC)
    - & Bureau of Labor Statistics (BLS)
  - Reaching out to BEA for more source data into the API

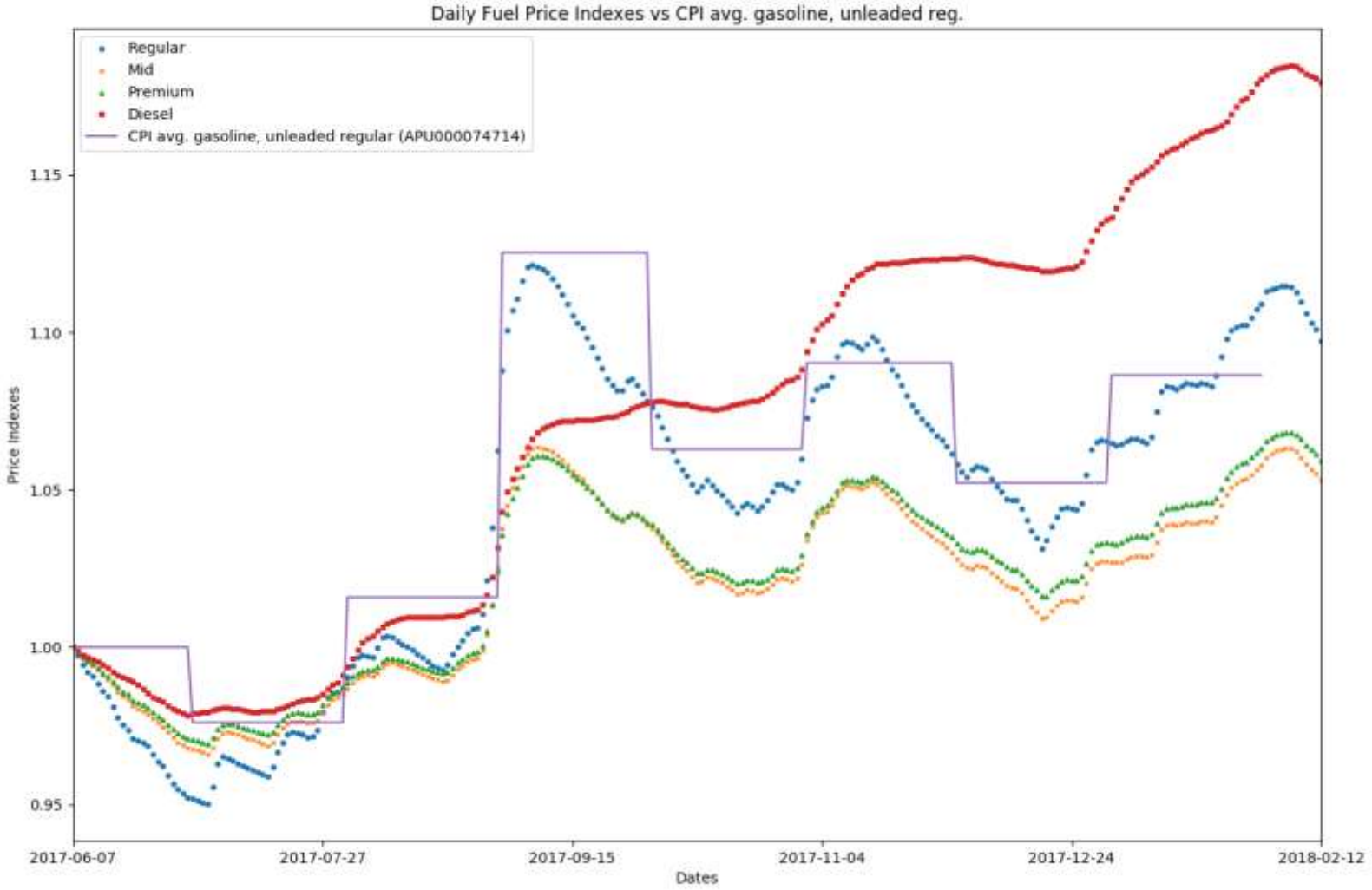
- Price research
  - A fairly significant amount of research into web scraping activity in potential support of the Consumer Price Index
  - Overall objective of automating collection of prices and product information to create price indexes

Consumer Price Index & Division of Price and Index Number Research

- Current Price Research
  - Using the API (with permission)
    - From retailers to collect prices and characteristic information on a weekly basis
    - From online price aggregator
  - Using DPINR's automated data collection
    - From retailers (with permission)

Gas prices (reg. grade) - 2018/2/6




Daily Fuel Price Indexes vs CPI avg. gasoline, unleaded reg.
Regular
Mid
Premium
Diesel
CPI avg. gasoline, unleaded regular (APU000074714)
Price Indexes
1.15
1.10
1.05
1.00
0.95
2017-06-07
2017-07-27
2017-09-15
2017-11-04
2017-12-24
2018-02-12
Dates

What have we learned?

BLS can systematically harness information on the internet for statistical use…clearly BLS has transitioned out of the ‘proof of concept’ stage.

Challenges

- Infrastructure
- Appropriate skills
- Research
- And…

Policy Issues

- Information on website=publicly available data?
- How does confidentiality apply?
- Optics & future respondent cooperation matter

In the Meantime

- Except for a few situations
  - CPI has scaled back effort
  - Secure permission prior to web scrape
- Guidance
  - Developing a business plan for each planned use
  - Developing a guidance/decision
- Discussion about current policy

Next Steps

- Policy concerns
- Begin to consider a centralized approach
- Continue to seek out opportunities

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