

Innovative Data Projects: Keeping BEA's Statistics Relevant

Brian C. Moyer, Director

February 27, 2019



- Update to Arts and Cultural Production Satellite Account
- New regional data on Outdoor Recreation
- New County-level GDP data
- Improving statistics for Puerto Rico
- Developing expanded measures of the Digital Economy
- GDP developments
- Expanding use of “Big Data”

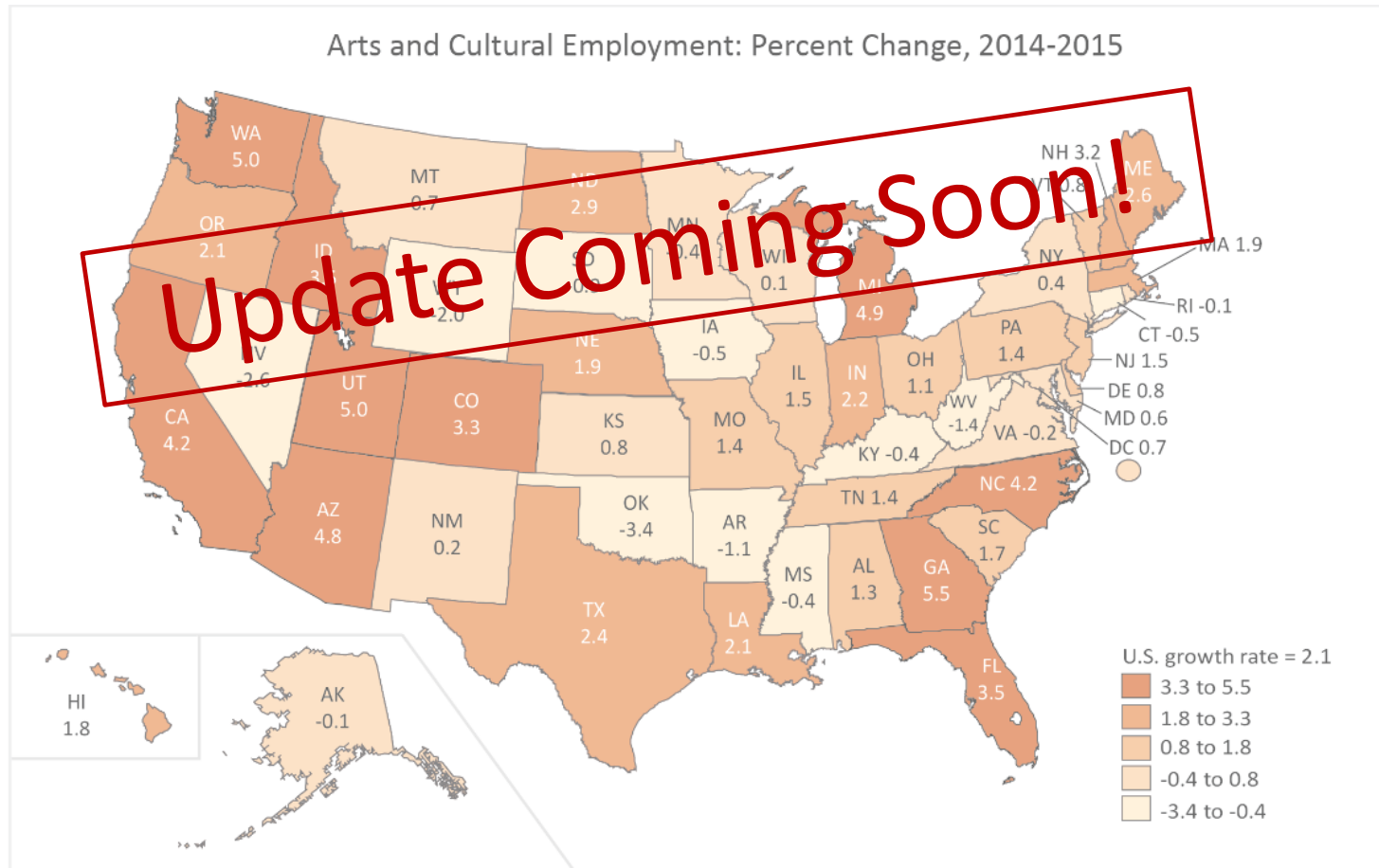
Arts and Cultural Production

763.6 Billion
4.2% of GDP

What the arts contribute
to the U.S. economy

4.9
Million

Number of workers in the
arts and cultural sector



Outdoor Recreation Statistics

- Outdoor Recreation Jobs and Economic Impact Act of 2016
 - “Conduct an **assessment and analysis of the outdoor recreation economy** of the United States and the effects attributable to such economy on the overall economy of the United States...
May consider employment, sales, and contributions to travel and tourism, and such other contributing components of the outdoor recreation economy.”
- Collaborated with seven federal agency partners, BEA released the first-of-its-kind *Outdoor Recreation Satellite Account*
- Goal for 2019: Develop regional dimension to national statistics



US Army Corps
of Engineers



\$412 billion of U.S. GDP in 2016

→ or **2.2%** of the economy



\$38.2 billion
Boating/Fishing



\$30.8 billion
RVing



\$19.5 billion
Motorcycling/ATVing

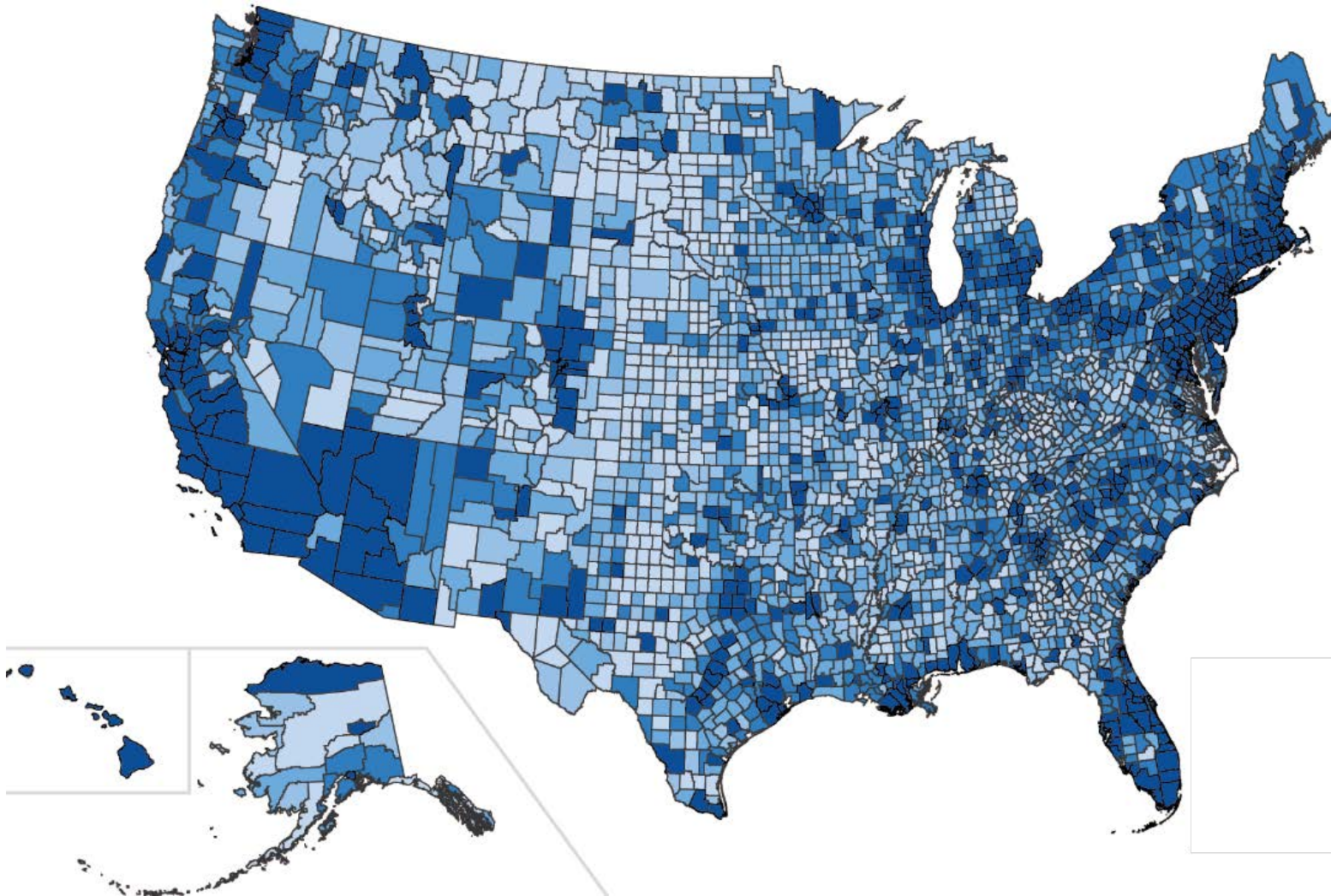
- Outdoor recreation GDP measures the value of production within the United States.
- Activities are measured by gross output, essentially sales or receipts.

New GDP by County Statistics



- Prototype statistics released December 2018
- New statistics for the nation's 3000+ counties provide a richer picture of the geographic distribution of economic activity
 - Nominal and inflation-adjusted annual GDP data available for 2012–2015
 - Data further broken down by goods industries, services industries, and government
- Key for assessing local economic performance, evaluating resource allocations, and informing local area economic development decision making
- Collecting user feedback for further refinements; new batch of county stats out this year

GDP by County, 2015



Improving Statistics for Puerto Rico



- Puerto Rico's financial crisis and Hurricane Maria heightened the need for more accurate economic data
- Various stakeholders recommended that BEA calculate GDP for Puerto Rico
- Began laying the groundwork for producing new GDP statistics late last year
- Because Puerto Rico is not included in full slate of Federal data collections, BEA will depend on local data collected in full cooperation and partnership with the Commonwealth
- Goal for 2019: Develop and publish nominal and inflation-adjusted annual estimates of select GDP components for 2012–2017

Measuring the Digital Economy



- Considerable interest in how fast-changing technologies and platforms are impacting the U.S. economy
- Project goals:
 - Define the digital economy and capture its contribution to economic growth
 - Improve measures of high-tech goods and services
 - Provide more information on e-commerce, including the gig and sharing economy
 - Provide more complete picture of international trade

Preliminary Results & Next Steps

How Big is the Digital Economy?

6.5% of U.S. GDP
or **\$1.2 trillion** in 2016



5.6% average annual growth
from 2006 to 2016

Outpaced overall U.S. economic growth of **1.5%**

5.9 million jobs

3.9% of total U.S. employment



\$114,275

Average annual compensation per worker

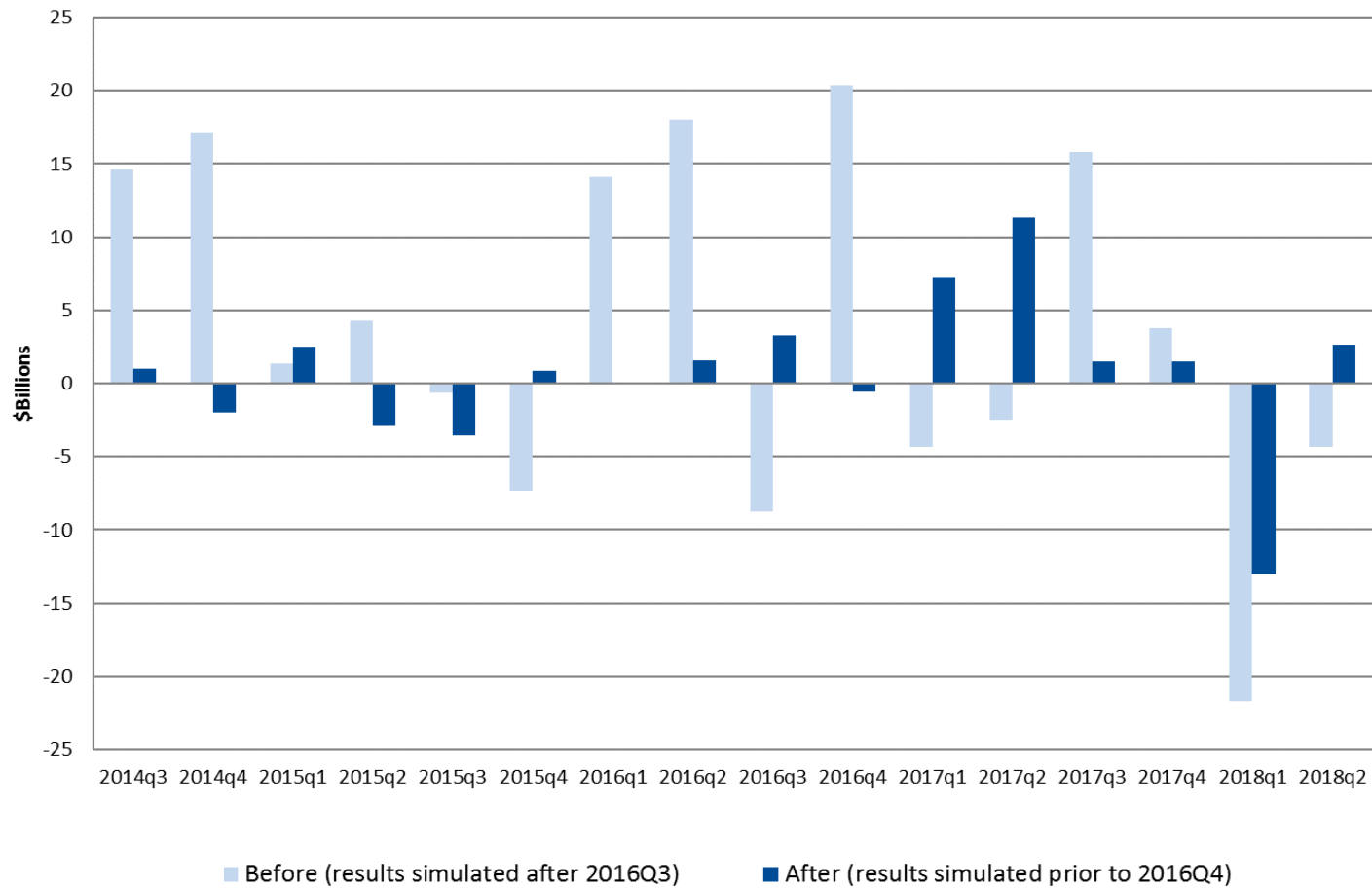


GDP Developments

- Faster Source Data for GDP
 - Collaboration with the Census Bureau to accelerate key data sources for “advance,” or initial estimate, of quarterly GDP
 - Foreign trade in goods data (July 2015), Business inventory data (July 2016), Services sector data (February 2017)
 - Construction data—currently evaluating early “cuts” of data and comparing with assumptions made for the advance GDP estimates for possible acceleration of Census data
 - More complete early information => smaller revisions to quarterly GDP
- Faster Releases of GDP Data
 - Long-term goal is near-simultaneous release of quarterly national, industry, and state GDP data
 - Currently conducting internal testing of coincident release of national and industry release of GDP
 - Goal: Accelerated GDP by Industry statistics in late 2020

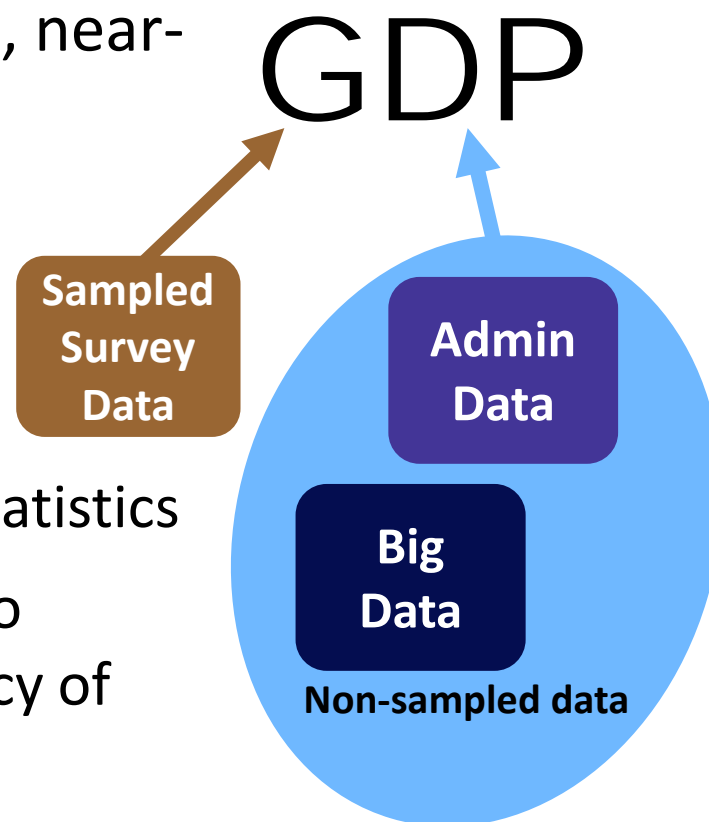
PCE Health Care Services

Comparison of Revisions



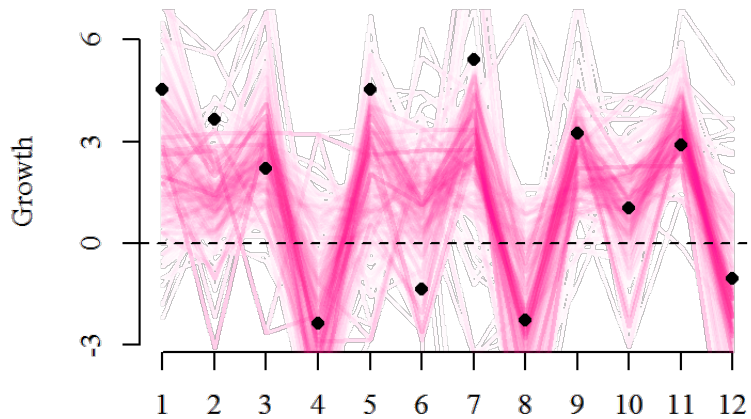
Harnessing “Big Data”

- Goal: To integrate nontraditional, near-real-time data to enhance BEA’s statistics
- Looking to big data to:
 - Fill data gaps
 - Expand the geographic detail of statistics
 - Facilitate passive data collection to improve the timelines and accuracy of source data

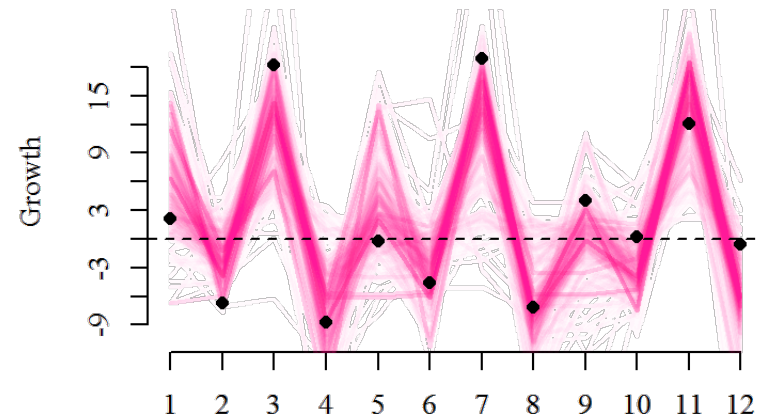


Credit Card Data & Machine Learning Techniques to Inform Early GDP Estimate Assumptions

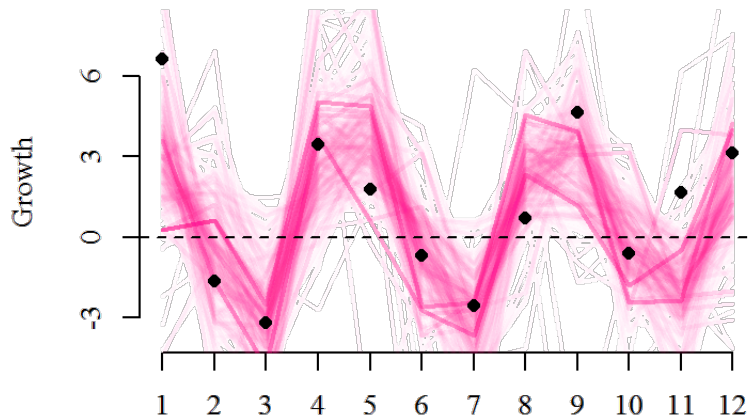
(1) Physician Offices



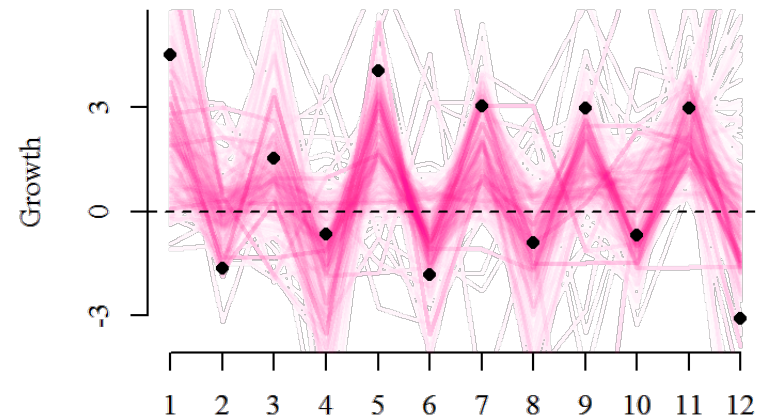
(2) Software Publishers



(3) Motor Vehicle Repair and Maintenance



(4) Medical Labs



Committed to Integrity

- BEA is a world-trusted, impartial source of comprehensive data about the U.S. economy
 - Required to maintain the quality, objectivity, and integrity of our data
 - Data releases are prompt, preannounced, and predictable; pre-release access is restricted
 - Regular, independent evaluations ensure high levels of accuracy

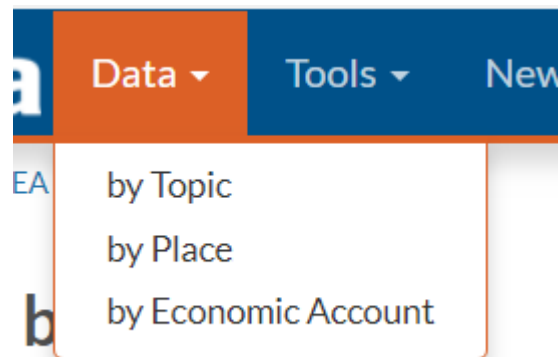
Finding Data Through BEA's Online Tools

Thomas Dail, Public Affairs and Outreach



- For the first time, you can come to our website and look for data by **topic** or **place**. This **new way of displaying content** went live in mid-August.
- That's a major improvement because we aren't forcing you to know how **BEA is organized** in order for you to find the data you want. Essentially, that was the **old way content** was made available on BEA's former public website.

- Visitors can use the Data button at the top of BEA's website to explore data by topic or place.

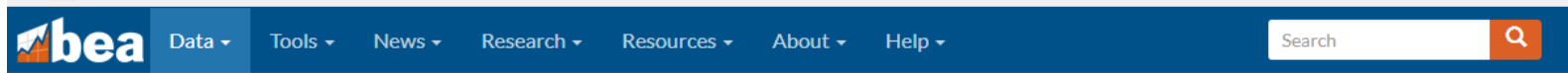


- We also have an escape hatch for people to get data the “old” way.

Noteworthy

- Improved Regional Tables
- County GDP Project
- Outdoor Recreation
- Digital Economy
- View Old Homepage

Offerings by Topic, Place, Old Way



Home | BEA Data

BEA Data

To find a statistic, or to explore BEA's data, start with one of the groupings below.

Browse

Data by Topic

Gross Domestic Product (GDP) • Consumer Spending • Income & Saving • Industries • International Trade & Investment • Prices & Inflation
• Investment in Fixed Assets • Employment • Government • Special Topics

Browse

Data by Place

United States • United States & the World • States and Territories • County, Metro, and Other Local Areas

Browse

Data by Economic Accounts

National • Regional • Industry • International

Offerings by Topic: GDP



Navigation bar with BEA logo, menu items (Data, Tools, News, Research, Resources, About, Help), a search box, and a breadcrumb trail: Home | BEA Data | GDP

Data by Topic

- Gross Domestic Product (GDP)**
- Consumer Spending
- Income & Saving
- Industries
- International Trade & Investment
- Prices & Inflation
- Investment in Fixed Assets
- Employment
- Government
- Special Topics
- All Topics

Gross Domestic Product

Gross Domestic Product

GDP is a comprehensive measure of the U.S. economy and its growth

GDP by Industry

Measures industries' performance and their contributions to GDP

GDP by State (with Industry Detail)

State counterpart of national GDP, including industries' contributions to each state economy

GDP by Metro Area (with Industry Detail)

GDP for metropolitan statistical areas, with industries' contributions to each metro economy

GDP by County

GDP for U.S. counties and county equivalents

GDP for U.S. Territories (with Industry Detail)

GDP for American Samoa, Northern Mariana Islands, Guam, and U.S. Virgin Islands

[Learn about Gross Domestic Product](#)

U.S. GDP: Look at the Product Page

Gross Domestic Product

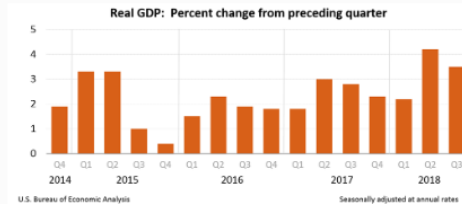
Gross Domestic Product, Third Quarter 2018 (Second Estimate); Corporate Profits, Third Quarter 2018 (Preliminary Estimate)

| | |
|-------------------|-------------|
| 3rd quarter 2018: | 3.5 percent |
| 2nd quarter 2018: | 4.2 percent |

Real gross domestic product (GDP) increased 3.5 percent in the third quarter of 2018, according to the "second" estimate released by the Bureau of Economic Analysis. The growth rate was unrevised from the "advance" estimate released in October. In the second quarter, real GDP increased 4.2 percent.

 [Current Release](#)

- **Current Release:** November 28, 2018
- **Next Release:** December 21, 2018



Current Release

Gross Domestic Product, Third Quarter 2018 (Second Estimate); Corporate Profits, Third Quarter 2018 (Preliminary Estimate)

[Full Release & Tables](#) ^(PDF)

[Technical Note](#) ^(PDF)

[Tables Only](#) ^(Excel)

[Release Highlights](#) ^(PDF)

[Historical Comparisons](#) ^(PDF)

What is Gross Domestic Product?

A comprehensive measure of U.S. economic activity, GDP is the value of the goods and services produced in the United States. The growth rate of GDP is the most popular indicator of the nation's overall economic health.

[Learn More](#)

Different Ways to Measure Prices, Inflation



Navigation bar with BEA logo, menu items (Data, Tools, News, Research, Resources, About, Help), a search box, and a breadcrumb trail: Home | BEA Data | Prices & Inflation

Data by Topic

[Gross Domestic Product \(GDP\)](#)

[Consumer Spending](#)

[Income & Saving](#)

[Industries](#)

[International Trade & Investment](#)

[Prices & Inflation](#)

[Investment in Fixed Assets](#)

[Employment](#)

[Government](#)

[Special Topics](#)

[All Topics](#)

Prices & Inflation

GDP Price Index

Measures changes in prices paid for goods and services produced in the United States

GDP Price Deflator

A price measure very similar to the GDP price index

Gross Domestic Purchases Price Index

BEA's featured measure of price changes in the U.S. economy overall

Personal Consumption Expenditures Price Index

Measures inflation in the prices paid by people living in the United States

Personal Consumption Expenditures Price Index, Excluding Food and Energy

The core PCE price index excludes two volatile categories to reveal underlying inflation

Regional Price Parities by State and Metro Area

Measure price levels that can be compared across states or metro areas

Health Care

Measures spending to treat diseases and provides price indexes of treatments

[Learn about Prices & Inflation](#)

- Your readers may be keenly interested in these inflation gauges, and not one of them listed is the **focus, or the headliner**, of a BEA news release.
- Personal Consumption Expenditures Price Index (overall and core) is the Federal Reserve's preferred inflation measure and is used as the central bank's inflation target in setting monetary policy.
- Shining a spotlight on BEA's popular and frequently sought after inflation gauges by both listing them individually and grouping them together make it easier for visitors to see what we have available and find what they want.

PCE Price Index Product Page

Personal Consumption Expenditures Price Index

Personal Consumption Expenditures Price Index

The PCE price index, released each month in the Personal Income and Outlays report, reflects changes in the prices of goods and services purchased by consumers in the United States. Quarterly and annual data are included in the GDP release.

Change from Month One Year Ago

| | |
|-----------------|-------------|
| September 2018: | 2.0 percent |
| August 2018: | 2.2 percent |
| July 2018: | 2.3 percent |

[Current Release](#)

Release Information

- **Current Release:** October 29, 2018
- **Next Release:** November 29, 2018



[Interactive Data](#)

[Documentation](#)

[Previously Published Estimates](#)

What is the Personal Consumption Expenditures Price Index?

A measure of the prices that people living in the United States, or those buying on their behalf, pay for goods and services. The PCE price index is known for capturing inflation (or deflation) across a wide range of consumer expenses and reflecting changes in consumer behavior.

- Gives you one-stopping shopping for the given product – the **monthly** PCE Price Index. In this case, the personal income and outlays news release is featured because the **monthly, year-over-year** PCE Price Index figures, closely followed by the Fed, Wall Street and others, are included in this report. The GDP news release contains **quarterly** PCE Price Index figures, but the **monthly** figures are most watched and sought after.
- A scoreboard provides a snapshot of the latest year-over-year numbers included in the news release.
- The “What is” box offers a deeper (layman’s) definition than the one-line blurb featured in the product listings by topic or place.

- Links to historical data in BEA’s interactive database are available on the page in the top “drawer.”
- Documentation – in this case the NIPA handbook – provides information on how the PCE Price Index is calculated, what it measures etc.
- Contact information
- Old estimates (data and news release archives)
- Link to Learn More

PCE Price Index: Learn More



Navigation bar with BEA logo, menu items (Data, Tools, News, Research, Resources, About, Help), a search box, and a breadcrumb trail: Home | Resources | Learning Center | Prices & Inflation

Prices & Inflation

The prices you pay for goods and services change all the time – moving at different rates and even in different directions. Some prices may drop while others are going up. A price index is a way of looking beyond individual price tags to measure overall inflation (or deflation) for a group of goods and services over time.

BEA produces several types of price indexes that help policymakers, business leaders, and consumers see the big pictures of price movements. The Federal Reserve, the central bank of the United States, relies on one of BEA's inflation measures when setting monetary policy. Federal agencies use them to help make spending plans.

U.S. Price Indexes

The [gross domestic product price index](#) measures changes in prices paid for goods and services produced in the United States, including those exported to other countries. Prices of imports are excluded. The [gross domestic product implicit price deflator](#), or GDP deflator, basically measures the same things and closely mirrors the GDP price index, although the two price measures are calculated differently. The GDP deflator is used by some firms to adjust payments in contracts.

The [gross domestic purchases price index](#) is BEA's featured measure of inflation for the U.S. economy overall. It measures changes in prices paid by consumers, businesses, and governments in the United States, including the prices of the imports they buy.

BEA's closely followed [personal consumption expenditures price index](#), or PCE price index, is a narrower measure. It looks at the changing prices of goods and services purchased by consumers in the United States. It's similar to the Bureau of Labor Statistics' consumer price index for urban consumers. The two indexes, which have their own purposes and uses, are constructed differently, resulting in different inflation rates.

The PCE price index is known for capturing inflation (or deflation) across a wide range of consumer expenses and for reflecting changes in consumer behavior. For example, if the price of beef rises, shoppers may buy less beef and more chicken. Also, BEA revises previously published PCE data to reflect updated information or new methodology, providing consistency across decades of data that's valuable for researchers. The PCE price index is used primarily for macroeconomic analysis and forecasting.

A variation is the [personal consumption expenditures price index, excluding food and energy](#), also known as the core PCE price index. The core index makes it easier to see the underlying inflation trend by excluding two categories – food and energy – where prices tend to swing up and down more dramatically and more

| Topics |
|----------------------------------|
| Gross Domestic Product (GDP) |
| Consumer Spending |
| Income & Saving |
| Industries |
| International Trade & Investment |
| Prices & Inflation |
| Investment in Fixed Assets |
| Employment |
| Government |
| Special Topics |

- These plain-language Learn More pages help visitors better understand our statistics – what they measure (or don't) and how they can be used in the real world.
- The Learn More pages also are grouped by product, not by which directorate produced them within BEA's organization. National price measures, state and metro price measures, and health care price measures are all together.

State and Metro Prices

Considering a job offer in a more expensive city? Looking for an affordable place to retire? Our regional price indexes can help.

You can compare buying power across the 50 states and the District of Columbia, or from one metropolitan area to another, by using BEA's [Regional Price Parities](#). State and metro price levels are expressed as a percentage of the overall national level.

Health Care Prices

BEA's special health care statistics include price indexes for treatments of different types of diseases. The [Health Care Satellite Account](#) looks at spending more like a patient does; it measures health care not as types of goods and services, such as a doctor's visit or hospital stay, but by the type of disease being treated, such as cancer or heart trouble.

Offerings by Place



Navigation bar with BEA logo, menu items (Data, Tools, News, Research, Resources, About, Help), a search box, and a breadcrumb trail: Home | BEA Data | United States

Data by Place

United States

United States & the World

States and Territories

County, Metro, and Other Local Areas

United States

Gross Domestic Product

Gross Domestic Product

GDP is a comprehensive measure of the U.S. economy and its growth

GDP by Industry

Measures industries' performance and their contributions to GDP

Consumer Spending

Consumer Spending

The nation's primary measure of consumer spending, or personal consumption expenditures

Personal Consumption Expenditures Price Index

Measures inflation in the prices paid by people living in the United States

Personal Consumption Expenditures Price Index, Excluding Food and Energy

The core PCE price index excludes two volatile categories to reveal underlying inflation

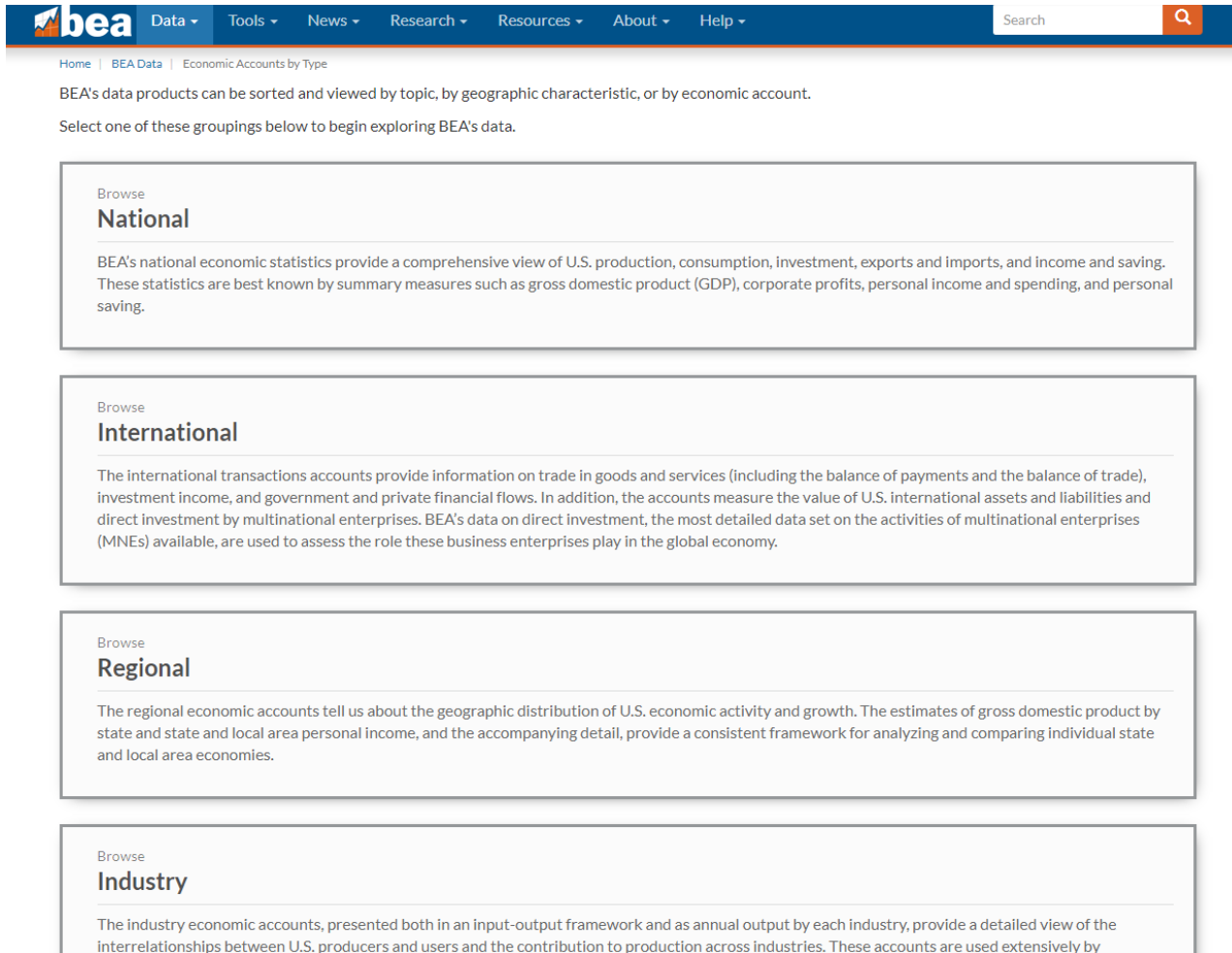
Income & Saving

Personal Income

Wages, Social Security, interest, rents, and other income received by U.S. residents

- You'll notice that the products are the same but they are organized by geography -- national, local, international.
- You may only want state GDP or state personal income.
- Or you may need state or metro prices (regional price parity data) along with national price data.

Offerings the Old Way



The screenshot shows the BEA website's navigation bar with a search box and a main content area. The navigation bar includes links for Home, BEA Data, Economic Accounts by Type, Data, Tools, News, Research, Resources, About, and Help. The main content area features four sections for browsing data: National, International, Regional, and Industry. Each section includes a brief description of the data products.

[Home](#) | [BEA Data](#) | [Economic Accounts by Type](#)

BEA's data products can be sorted and viewed by topic, by geographic characteristic, or by economic account.

Select one of these groupings below to begin exploring BEA's data.

Browse
National

BEA's national economic statistics provide a comprehensive view of U.S. production, consumption, investment, exports and imports, and income and saving. These statistics are best known by summary measures such as gross domestic product (GDP), corporate profits, personal income and spending, and personal saving.

Browse
International

The international transactions accounts provide information on trade in goods and services (including the balance of payments and the balance of trade), investment income, and government and private financial flows. In addition, the accounts measure the value of U.S. international assets and liabilities and direct investment by multinational enterprises. BEA's data on direct investment, the most detailed data set on the activities of multinational enterprises (MNEs) available, are used to assess the role these business enterprises play in the global economy.

Browse
Regional

The regional economic accounts tell us about the geographic distribution of U.S. economic activity and growth. The estimates of gross domestic product by state and state and local area personal income, and the accompanying detail, provide a consistent framework for analyzing and comparing individual state and local area economies.

Browse
Industry

The industry economic accounts, presented both in an input-output framework and as annual output by each industry, provide a detailed view of the interrelationships between U.S. producers and users and the contribution to production across industries. These accounts are used extensively by

- For creatures of habit, we still offer the old way to get information about our products.
- We organize statistics by the part of the BEA organization that produces them – national, international, regional, and industry.

- Organizing our products by topic and place offers visitors an easy and quick way to access and get information on some of our most popular statistics.
- This structure also quickly exposes people to the depth and breadth of the statistics we produce. Simply by scanning the groupings, people can figure out, for instance, that BEA produces much more than our signature, national GDP stats.

Wrapping it Up

Data by Topic

Gross Domestic Product (GDP)

Consumer Spending

Income & Saving

Industries

International Trade & Investment

Prices & Inflation

Investment in Fixed Assets

Employment

Government

Special Topics

All Topics

Clicking **All Topics** shows every offering and its description. This way, customers can see all of our data on one page.

Gross Domestic Product

Gross Domestic Product

GDP is a comprehensive measure of the U.S. economy and its growth

GDP by Industry

Measures industries' performance and their contributions to GDP

GDP by State

State counterpart of national GDP, including industries' contributions to each state economy

GDP by Metro Area

GDP for metropolitan statistical areas, with industries' contributions to each metro economy

GDP for U.S. Territories

GDP for American Samoa, Northern Mariana Islands, Guam, and U.S. Virgin Islands

Consumer Spending

Consumer Spending

The nation's primary measure of consumer spending, or personal consumption expenditures

Consumer Spending by State

Spending by residents of the 50 states and D.C.

Personal Consumption Expenditures Price Index

Measures inflation in the prices paid by people living in the United States

Personal Consumption Expenditures Price Index, Excluding Food and Energy

The core PCE price index excludes two volatile categories to reveal underlying inflation

Income & Saving

Personal Income

Wages, Social Security, interest, rents, and other income received by U.S. residents

Personal Income by State

Wages, proprietors' income, dividends, interest, rents, and other income received by each state's residents

Personal Income by County, Metro, and Other Areas

Wages, proprietors' income, dividends, interest, rents, and other income received by local residents

Real Personal Income by State and Metro Area

Personal income adjusted for state and metro area price level differences and national inflation

...and so on

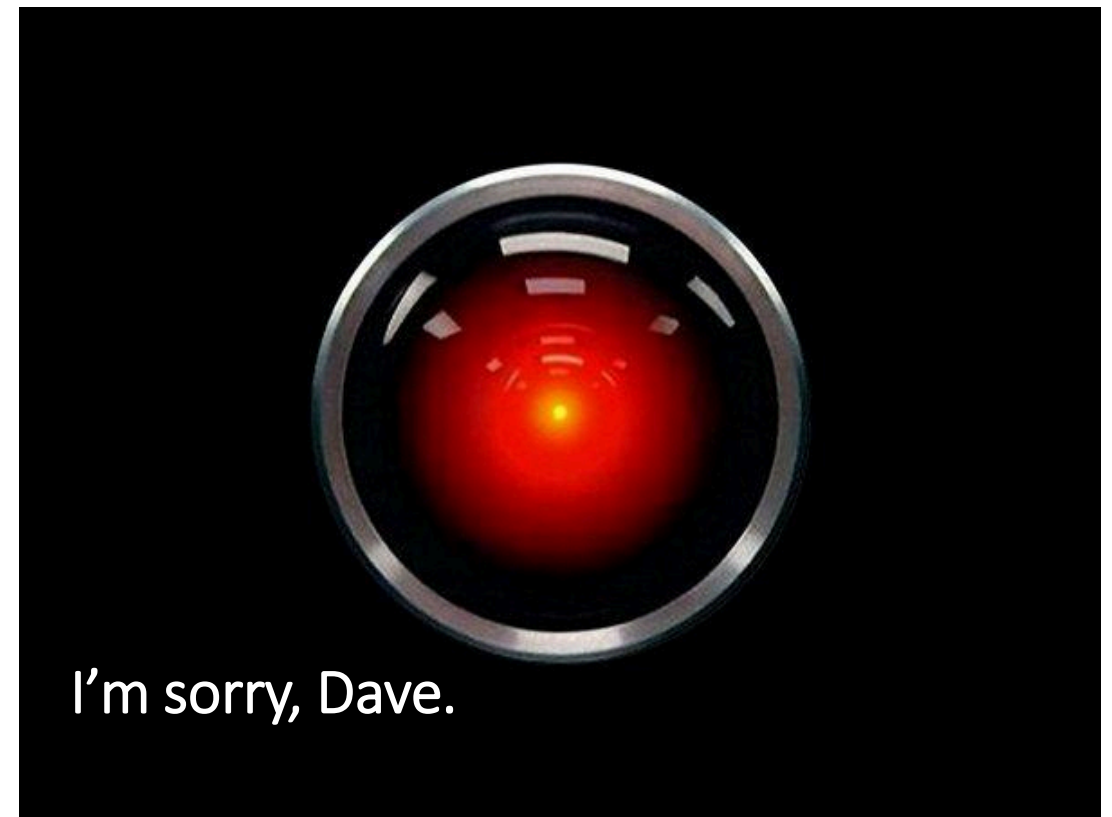
Machine Learning and Economics

Jeff Chen

Chief Innovation Officer



What's Machine Learning?



This Person Does Not Exist



Source: <https://thispersondoesnotexist.com>

Part 1

“The Malfoys!” said Hermione.

Harry was watching him. He looked like Madame Maxime. When she strode up the wrong staircase to visit himself.

“I’m afraid I’ve definitely been suspended from power, no chance—indeed?” said Snape. He put his head back behind them and read groups as they crossed a corner and fluttered down onto their ink lamp, and picked up his spoon. The doorbell rang. It was a lot cleaner down in London.

Hermione yelled. The party must be thrown by Krum, of course.

Harry collected fingers once more, with Malfoy. “Why, didn’t she never tell me. ...” She vanished. And then, Ron, Harry noticed, was nearly right.

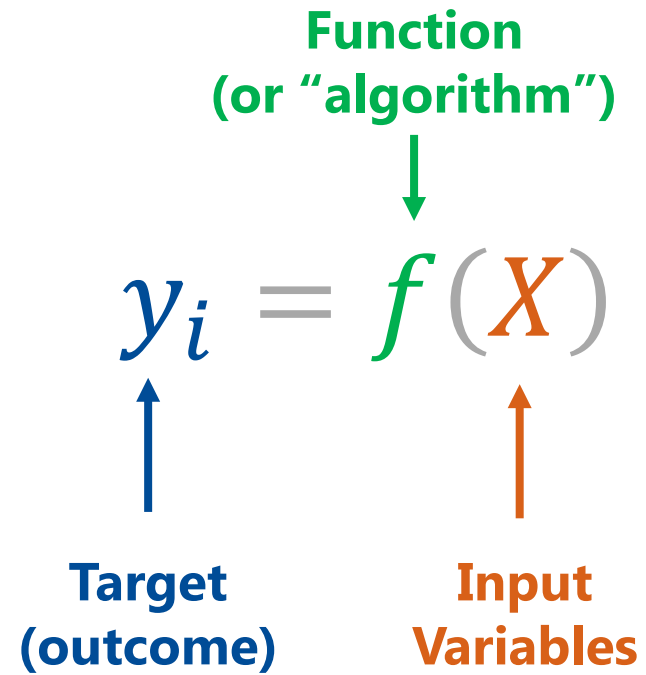
“Now, be off,” said Sirius, “I can’t trace a new voice.”

He punished Uncle Vernon, so loudly that she could barely use it with Viktor Krum, these faces in one side of their previous year. Mr. Dursley again was this champion. He was about to give the Remembrall there.... every time he

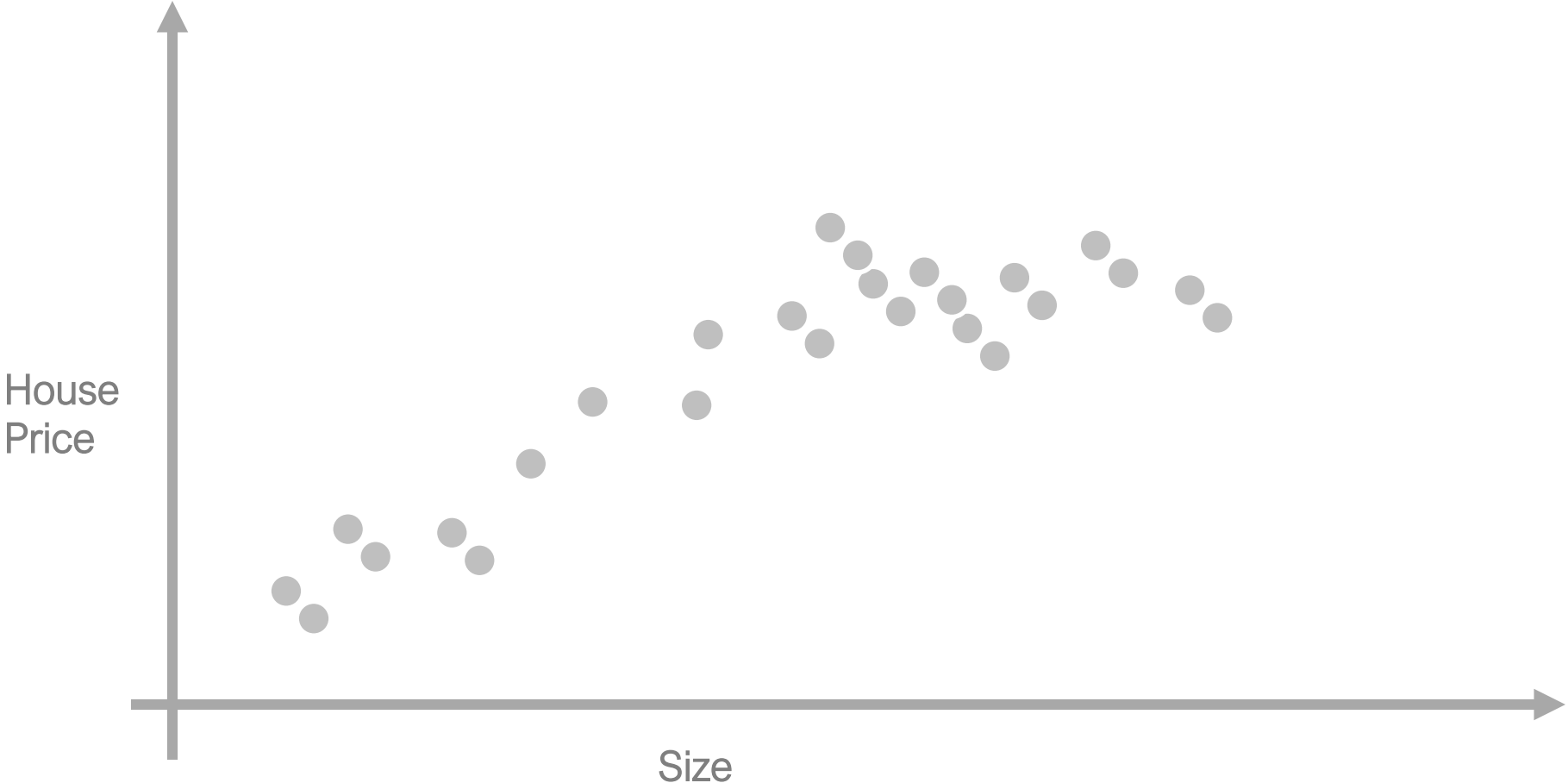
What's Machine Learning?

$$y_i = f(X)$$

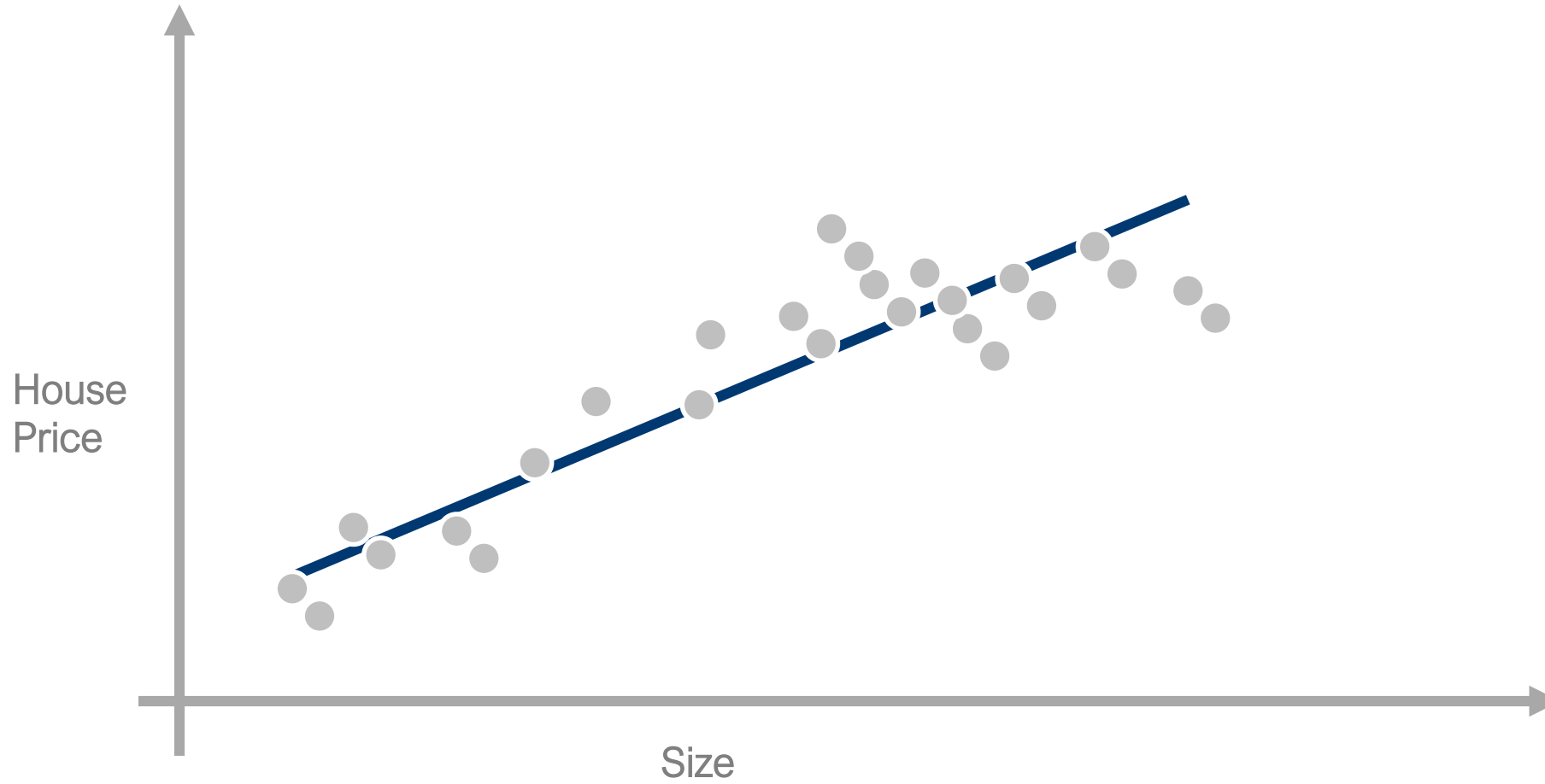
What's Machine Learning?



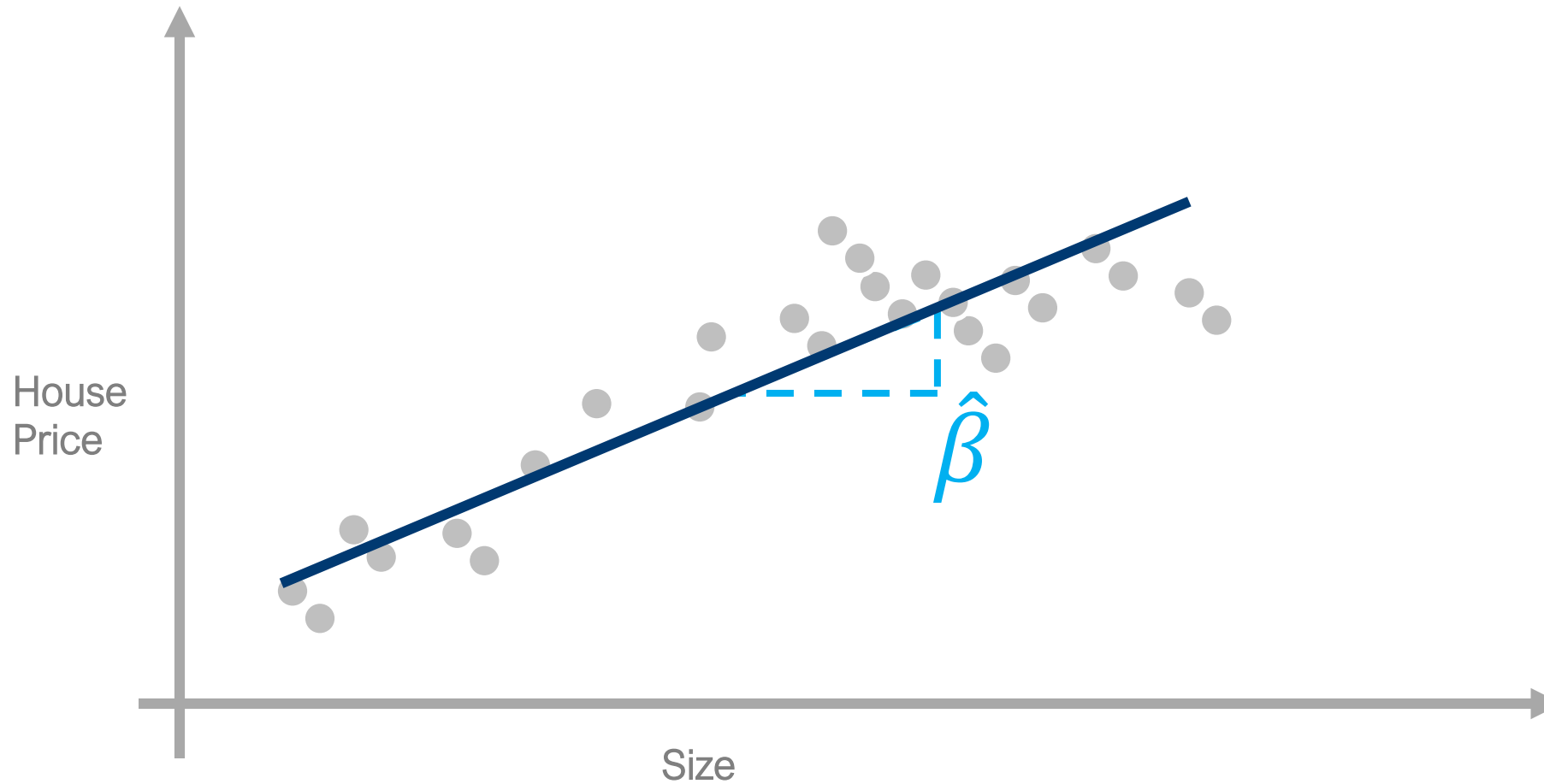
A simple example



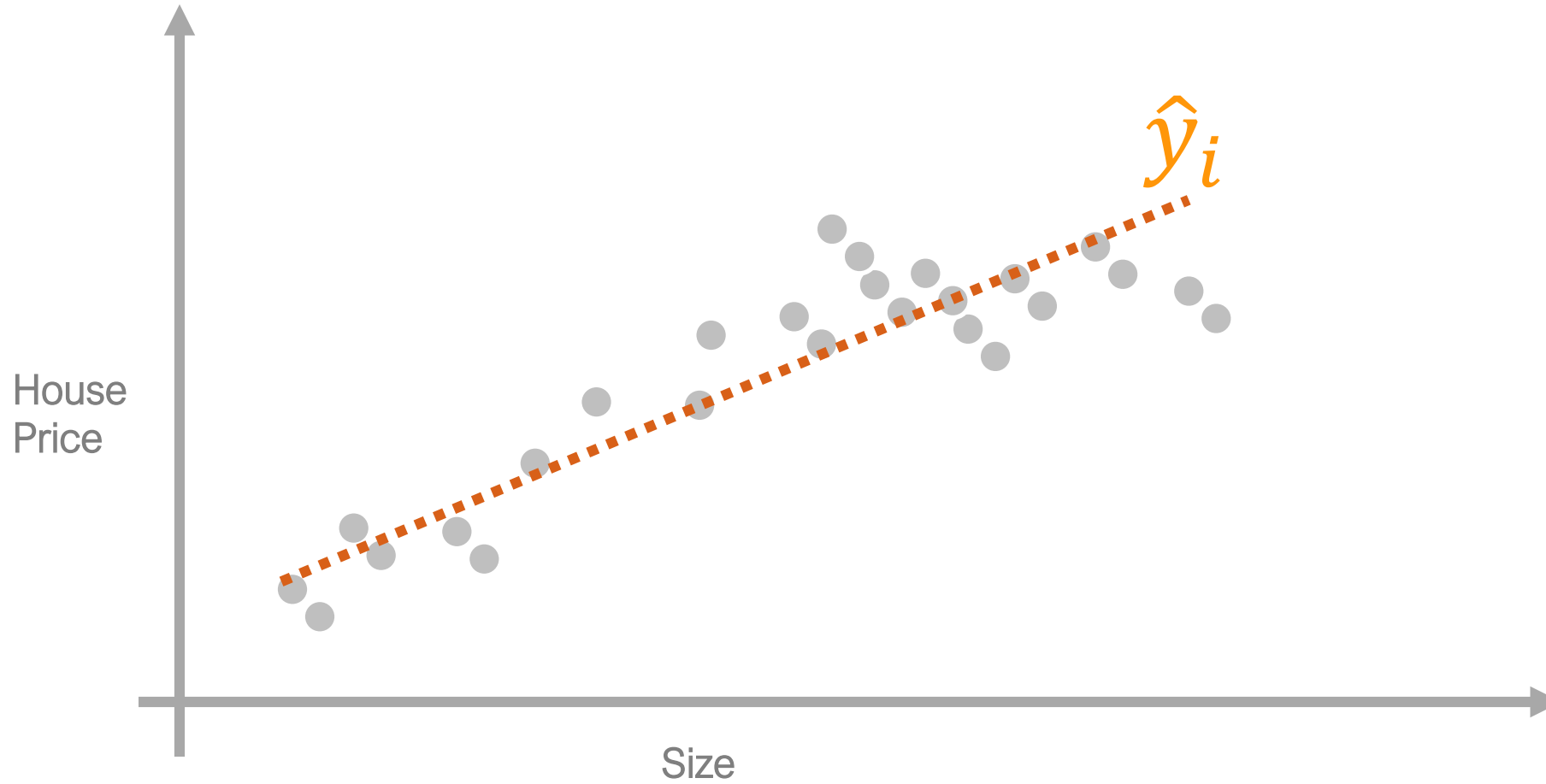
Fitting a line



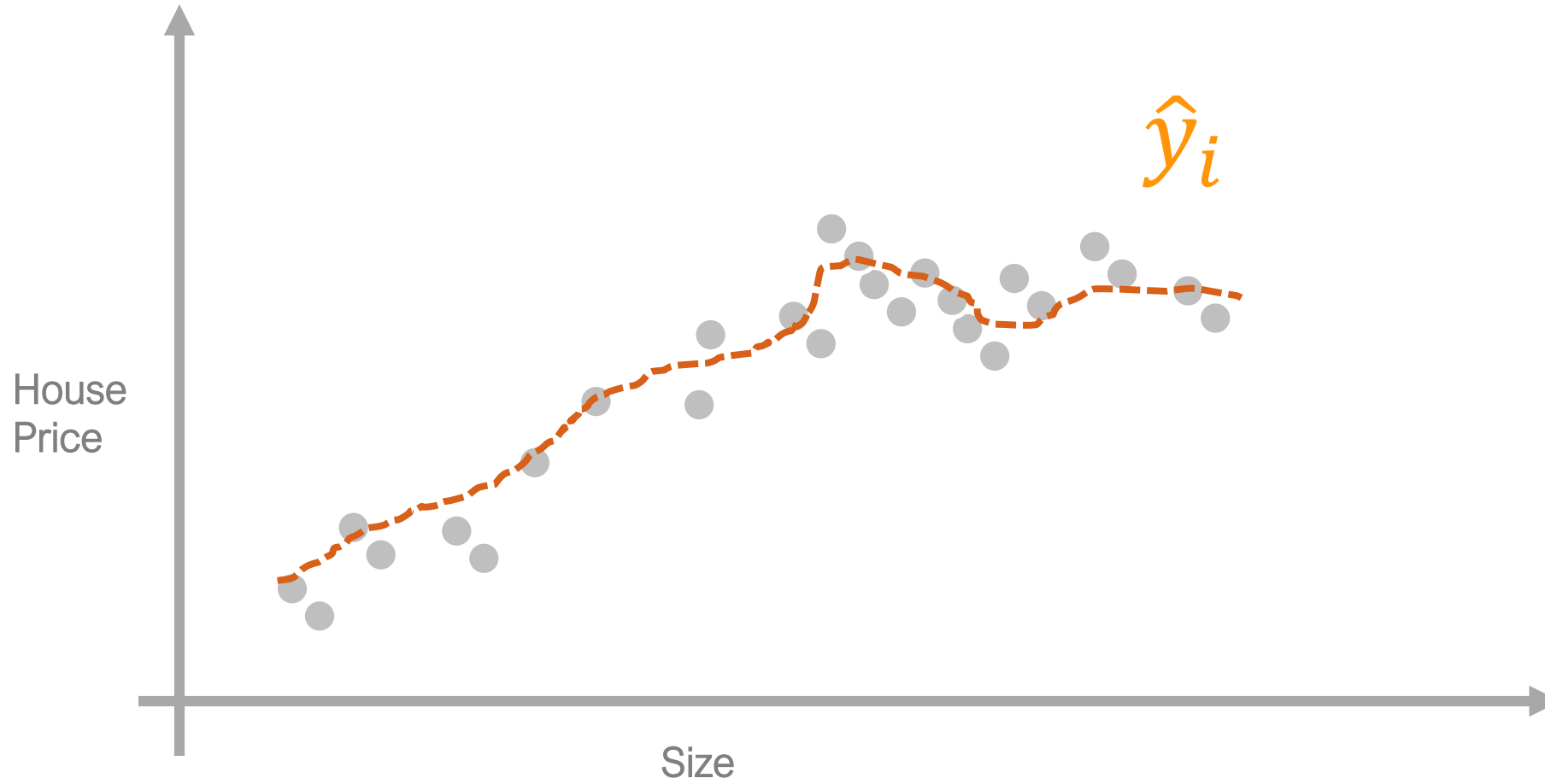
Economics generally is interested in parameter estimation



ML is interested in prediction



ML is interested in prediction



Flavors of Machine Learning

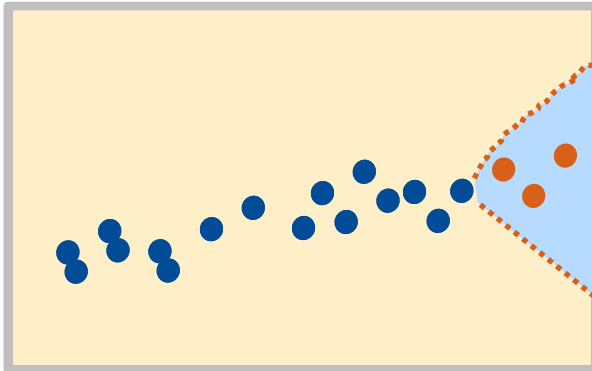
Methods in Economics

- Linear Regression
- ARIMA and other time series
- Quantile Regression

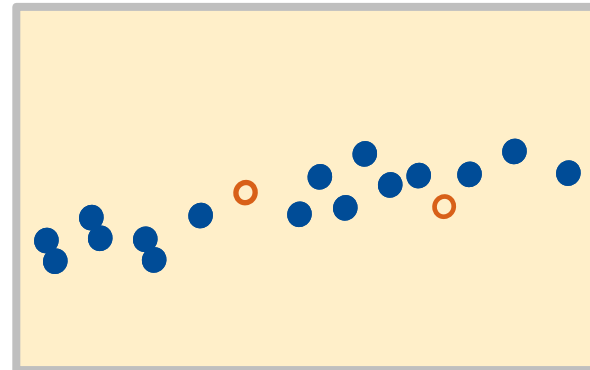
Methods for Prediction

- Linear Regression
- ARIMA
- Quantile Regression
- Ensemble Models
- Gradient Boosting
- Regularized Regression
- Adaptive Boosting
- Regression Trees
- Random Forests
- Support Vector Machines
- Multi-Adaptive Regression Splines
- Convolutional Neural Networks
- Recurrent Neural Networks
- Long Short Term Memory Networks
- Generative Adversarial Networks
- Latent Dirichlet Allocation
- + many more

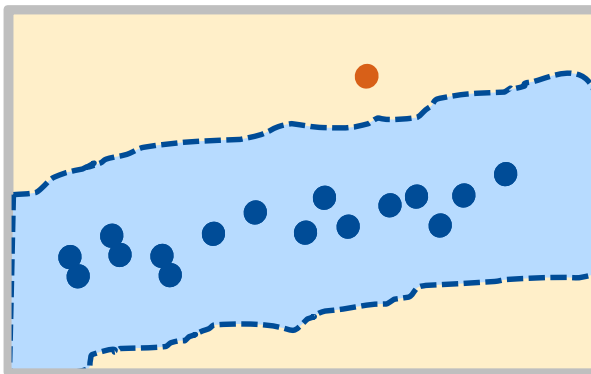
What is BEA doing in this space?



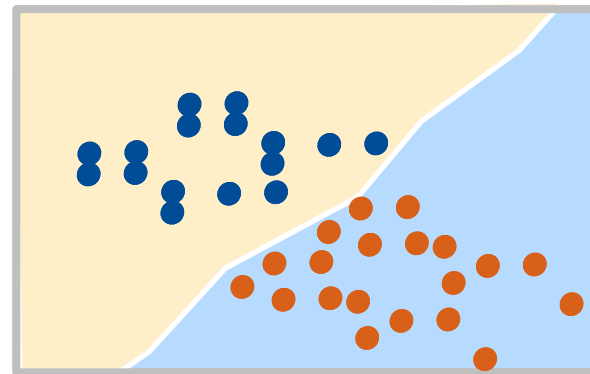
Short-range prediction



Imputation

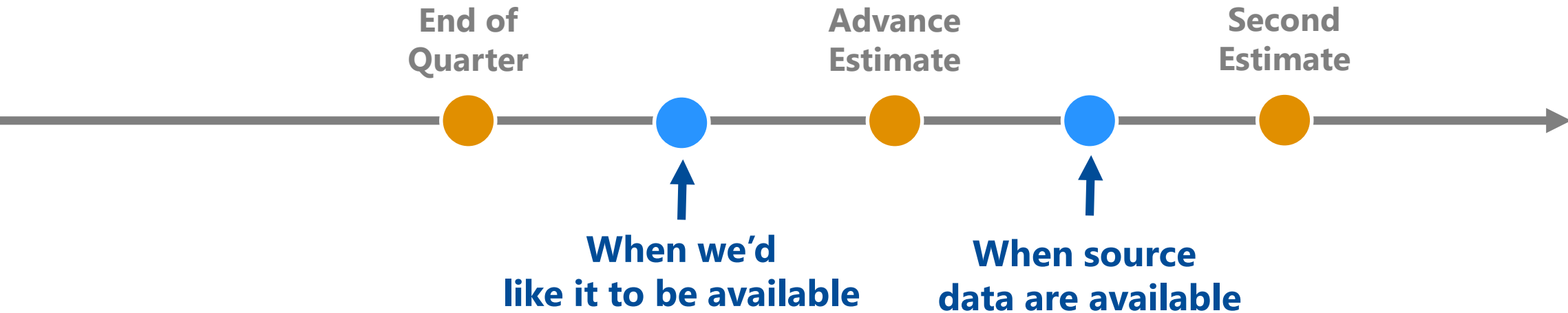


Anomaly detection

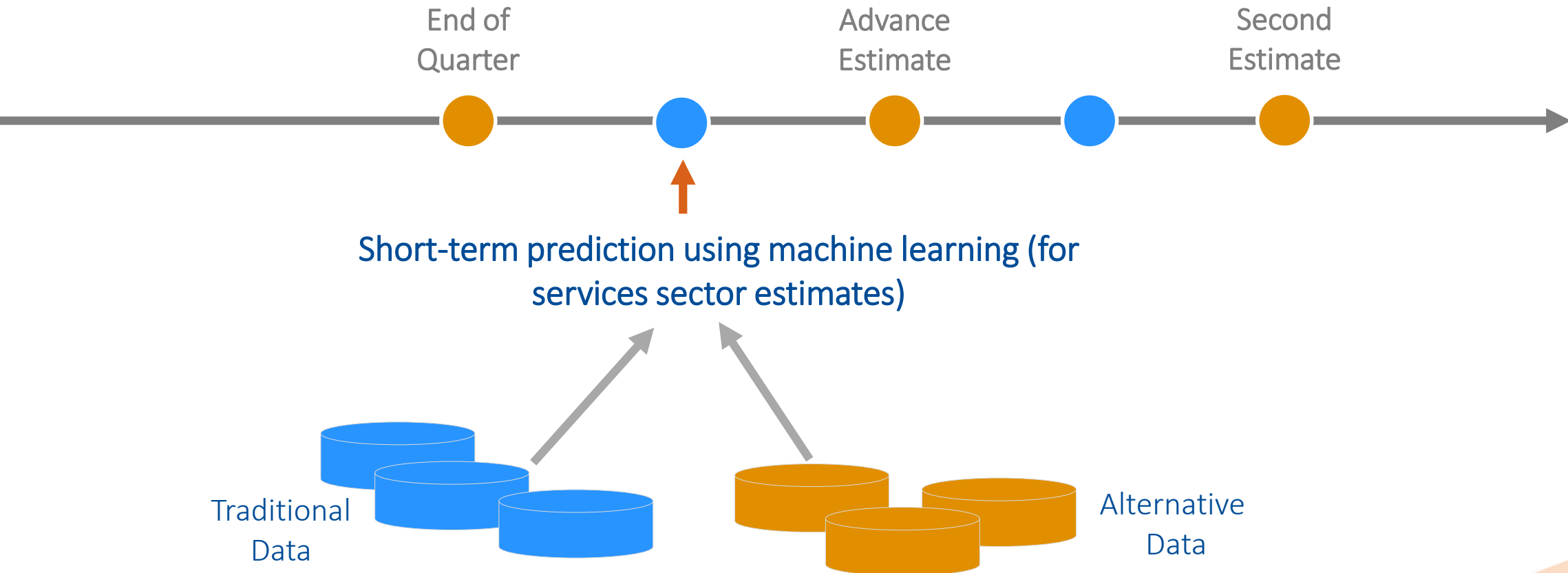


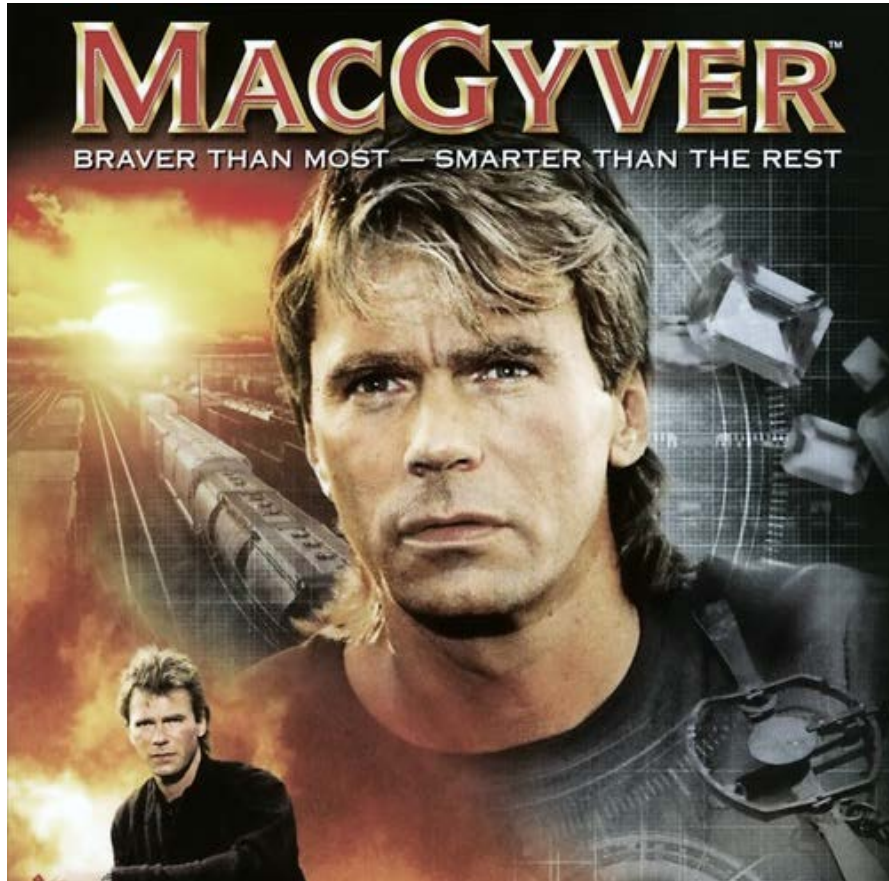
Classification

Service Sector Source Data Timing



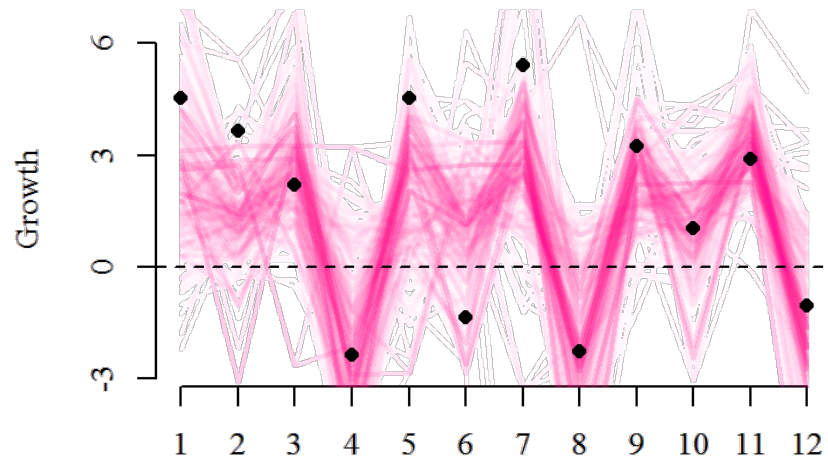
What is BEA doing in this space?



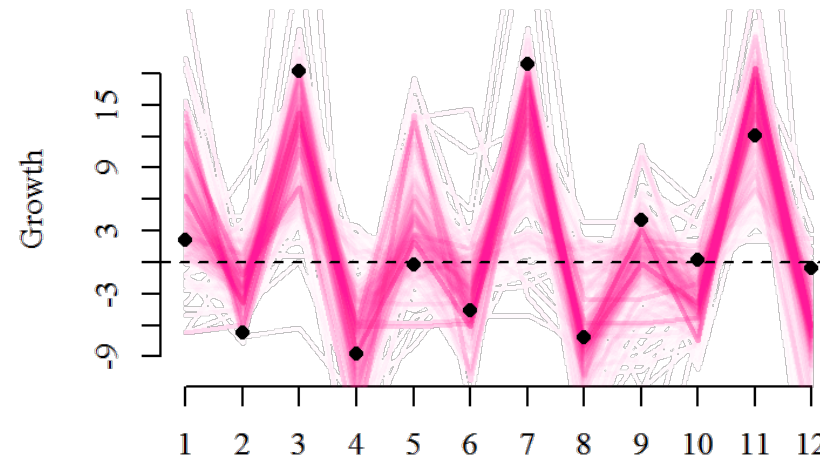


- Project working title named “**MacGyvertron**” as Angus MacGyver is able to turn a win when the odds are overwhelmingly against him.
- Trains **millions of models** on BEA’s cloud computing infrastructure, then constructs an **ensemble**.
- Assessed over **1000 economic and social variables** ranging from aggregate credit card transactions to employment estimates.
- Methodology helps spot parts of PCE that are a improvable.

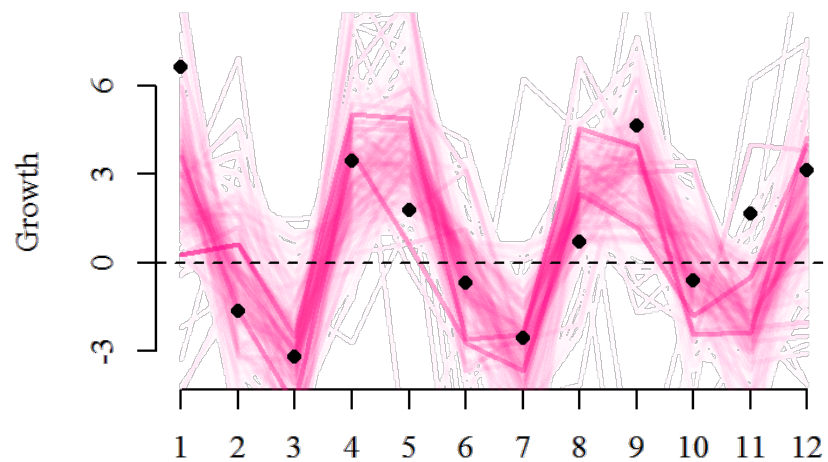
(1) Physician Offices



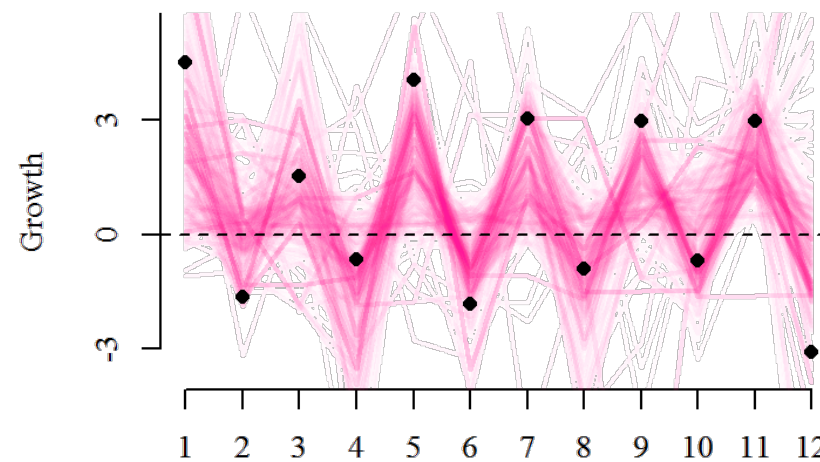
(2) Software Publishers



(3) Motor Vehicle Repair and Maintenance

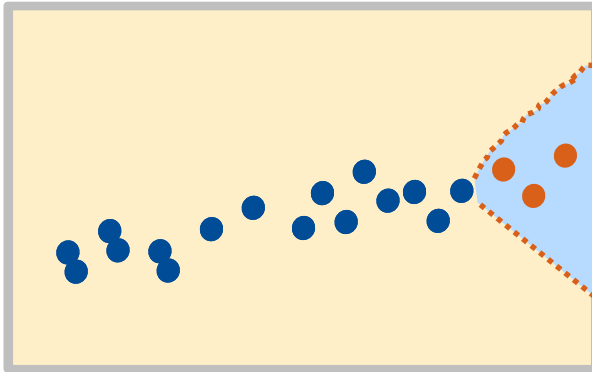


(4) Medical Labs

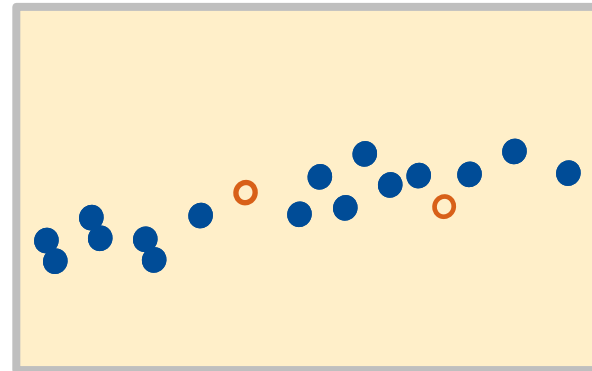


Simulated impacts on PCE Estimates

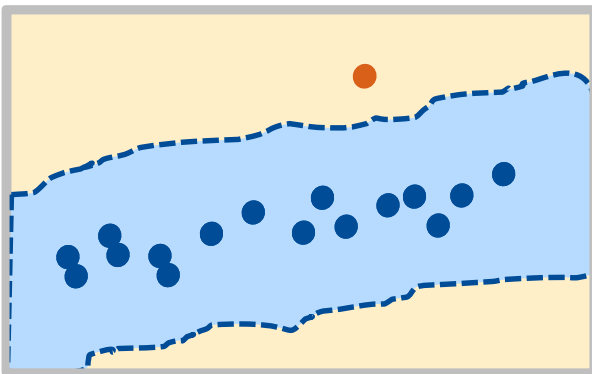
- It is possible to improve all advance PCE estimates using ML models, but only approximately **one-third** of PCE service series are can yield **'sure-fire'** improvements.
- Average **12%** reduction in revisions to PCE, but can be as much as **20%** as the model improves.
- There are larger revision reductions to subcomponents of PCE per quarter.
 - Health: **+11%**
 - Transportation: **+25%**
 - Personal Care and Clothing: **+27%**



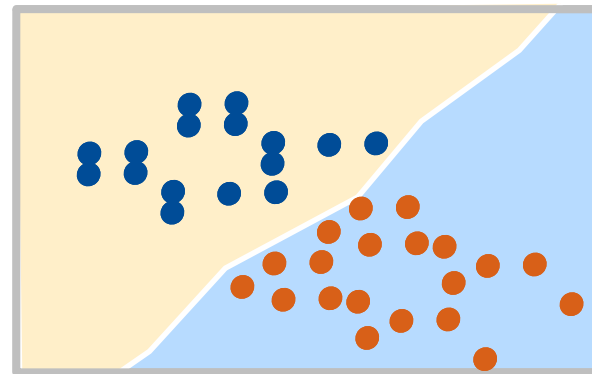
Short-range prediction



Imputation



Anomaly detection



Classification

Jeffrey.Chen@bea.gov



Satellite Accounts: Arts & Cultural Production Outdoor Recreation

2019 Goldschmidt Data Immersion Workshop

January 27, 2019



What are Satellite Accounts?

- Frameworks designed to expand the analytical capacity of the standard accounts without interfering with their general purpose.
 - Allows more focus on a specific activity
 - Provides a laboratory for development of concepts and methodologies
 - Expands the detail of the accounts
 - Flexible classification structure

Defining Arts & Cultural Production?



Creative
artistic
activity

The goods and services produced
by it

The goods and services produced
in the support of it

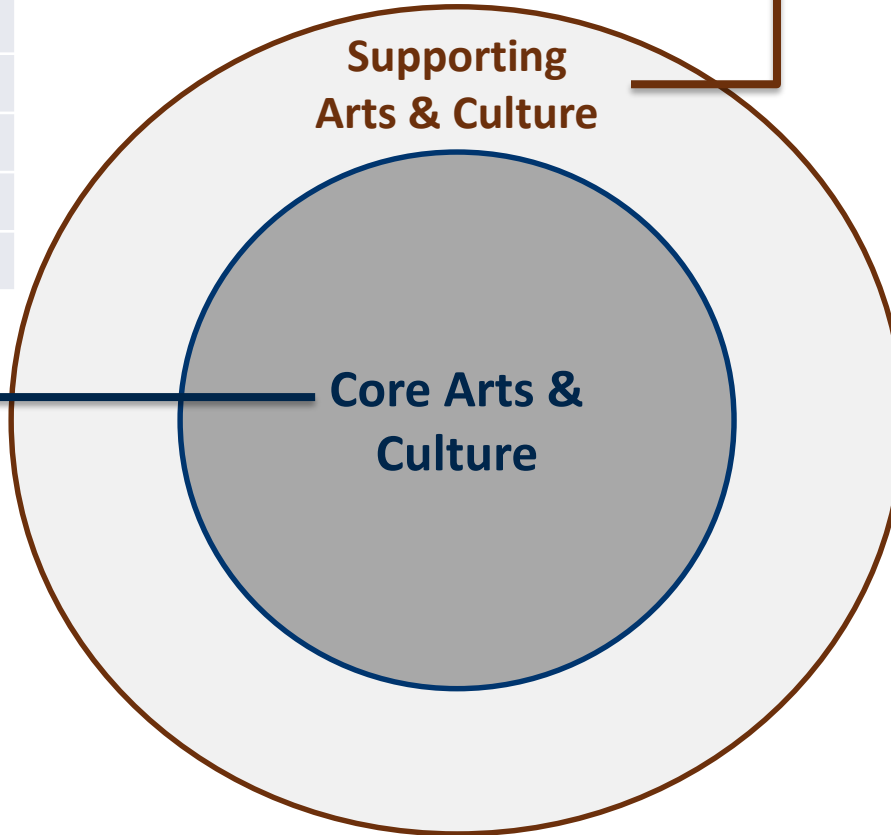
And finally the construction of
buildings in which it is taking place

- A ballerina attends a dance academy and then performs a beautiful rendition of Swan Lake.
- The dance academy and performance are Core Arts Activities.
- The show is recorded and broadcast on television for millions to see.
- The recording and broadcasting, and construction of the theater are Supporting Arts Activities.

Defining Cultural Production

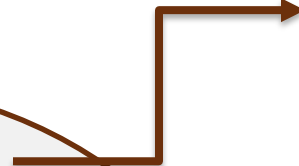
Core Arts & Cultural Production

- Performing Arts
- Museums
- Design services
- Fine Arts Education
- Education Services



Supporting Arts and Cultural Production

- Government
- Publishing
- Motion Pictures
- Sound Recording
- Broadcasting
- Manufacturing
- Construction
- Retail Industries



Which industries does the ACPSA include:



| |
|---|
| Total |
| Core Arts and Cultural Production |
| Performing Arts |
| Performing Arts Companies |
| Promoters of Performing Arts and Similar Events |
| Agents/Managers for Artists |
| Independent Artists, Writers, and Performers |
| Museums |
| Design Services |
| Advertising |
| Architectural Services |
| Landscape Architectural Services |
| Interior Design Services |
| Industrial Design Services |
| Graphic Design Services |
| Computer Systems Design |
| Photography and Photofinishing Services |
| All Other Design Services |
| Fine Arts Education |

| |
|---|
| Supporting Arts and Cultural Production |
| Art Support Services |
| Rental and Leasing |
| Grant-Making and Giving Services |
| Unions |
| Government |
| Other Support Services |
| Information Services |
| Publishing |
| Motion Pictures |
| Sound Recording |
| Broadcasting |
| Other Information Services |
| Manufacturing |
| Jewelry and Silverware Manufacturing |
| Printed Goods Manufacturing |
| Musical Instruments Manufacturing |
| Custom Architectural Woodwork and Metalwork Manufacturing |
| Camera and Motion Picture Equipment Manufacturing |
| Other Goods Manufacturing |
| Construction |
| Wholesale and Transportation Industries |
| Retail Industries |
| All Other Industries¹ |

Defining Outdoor Recreation

| | | |
|---|---|---|
|  BICYCLING Paved-road Off-road |  MOTORCYCLING On-road Off-road |  TRAIL SPORTS Trail running, unpaved Day hiking, unpaved Backpacking Rock climbing (natural rock or ice) |
|  CAMPING RV campsite Tent campsite Rustic lodging |  OFF-ROADING ATV ROV Dune buggies Jeeping |  WATER SPORTS Kayaking Stand-up paddling Rafting Canoeing Boating (motorized) |
|  FISHING Recreational fly Recreational non-fly Fishing from a boat |  SNOW SPORTS Downhill skiing (including telemark) Snowboarding Cross-country skiing Nordic skiing Snowshoeing Snowmobiling |  WILDLIFE VIEWING Bird watching Other wildlife watching |
|  HUNTING Shotgun Rifle Bow | | |

Conventional outdoor recreation activities

- Outdoor activities that usually occur in nature-based settings and that require physical exertion

Source: Outdoor Industry Association

Defining Outdoor Recreation

Comprehensive outdoor recreation activities

- Conventional activities, plus any non-work time spent doing outdoor activities (Oregon State University)

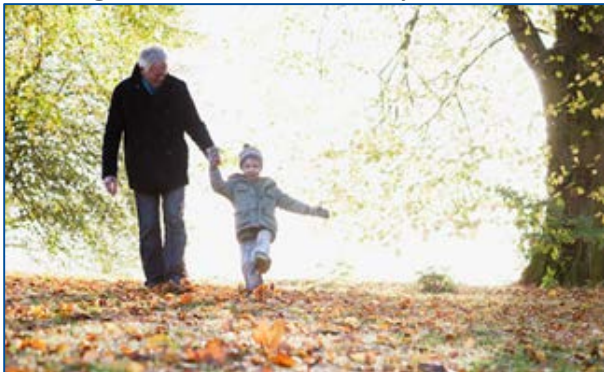


Table III-I: Percentage of Households Participating in Activities [2011 -- All Varieties]

| Activities | Percent |
|---------------------------------------|---------|
| Walking for pleasure | 82.2% |
| Visiting historic sites | 63.5% |
| Visiting parks (local, state, natl.) | 50.6% |
| Visiting natural area/preserve/refuge | 50.3% |
| Swimming/pool | 43.1% |
| Sunbathing/relaxing on a beach | 41.3% |
| Swimming/beach | 38.3% |
| Jogging/running | 33.6% |
| Using a playground | 29.9% |
| Picnicking away from home | 28.0% |
| Visiting gardens/arboretums | 25.6% |
| Hiking/backpacking | 24.8% |

Source: Virginia Department of Conservation and Recreation

Defining Outdoor Recreation: Activities

Total Outdoor Recreation

Total Core Outdoor Recreation

Conventional Outdoor Recreation

Bicycling

Boating/Fishing

Canoeing/Kayaking

Sailing

Other Boating/Fishing

Camping/Climbing/Hiking

Equestrian

Hunting/Shooting/Trapping

Hunting

Other Shooting/Trapping

Motorized Vehicles

Motorcycles

RVs

Other Motorized Vehicles

Recreational Flying

Conventional Outdoor Recreation—*continued*

Skiing

Snowboarding

Other Conventional Outdoor Recreation Activities¹

Multi-use Apparel and Accessories (Conventional)²

Other Outdoor Recreation

Amusement Parks/Water Parks

Festivals/Sporting Events/Concerts

Field Sports

Game Areas (including Golf and Tennis)

Guided Tours/Outfitted Travel

Productive Activities

Other Outdoor Recreation Activities³

Multi-use Apparel and Accessories (Other)²

Supporting Outdoor Recreation

Construction

Trips and Travel⁴

Government Expenditures

- Use BEA's I-O framework to provide:
 - Information on a defined group of goods and services that are currently in the U.S. GDP accounts, but not clearly visible
- A detailed accounting of the economic contribution of a particular sector

Estimate Partial Categories: Bicycling

US Bicycling Participation Survey

| | |
|---------------------|-----|
| Recreation only | 55% |
| Transportation only | 7% |
| Both | 37% |

Source: PeopleForBikes

People who ride bicycles might buy biking shoes, gloves, backpacks and repair services, as well as bikes and parts.



- **Gross Output**
 - The value of the goods and services produced; measured using industry sales or receipts, including sales to final users (GDP) and sales to other industries (intermediate inputs).
- **Value added**
 - GDP or value added is the gross output of an industry or a sector less its intermediate inputs.

- Employment
 - All wage-and-salary jobs where the workers are engaged in the production of goods and services.
- Compensation
 - Consists of the remuneration (including wages and salaries, as well as benefits such as employer contributions to pension and health funds) payable to employees in return for their work during a given year.

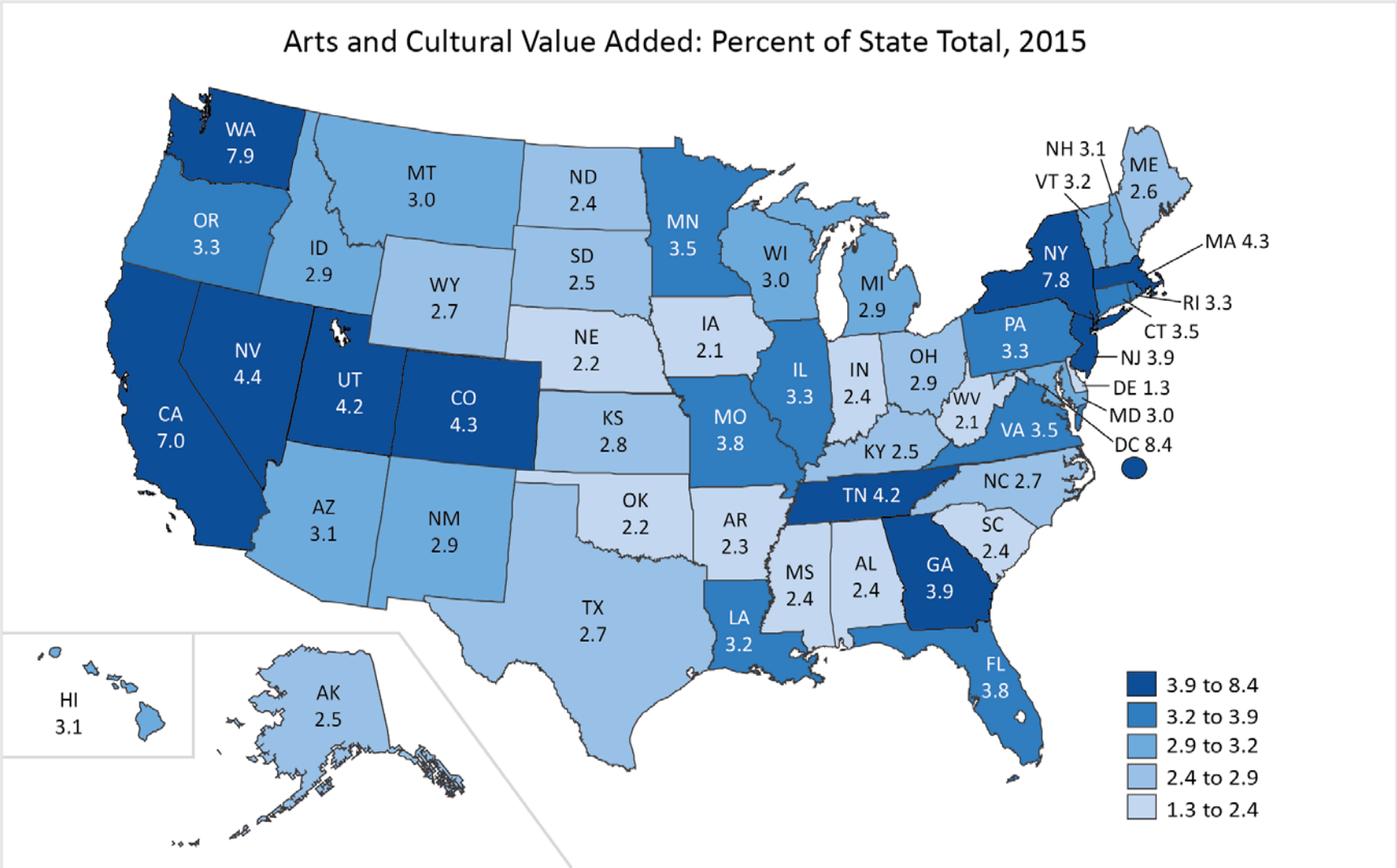
2015 Arts & Cultural Production



| | GDP | Compensation | Employment |
|-----------------|--------------------|---------------------|-------------------|
| Total US | \$18,219.3 Billion | \$9,707.9 Billion | 146.6 Million |
| | \$763.6 Billion | \$372.5 Billion | 4.9 Million |
| US Arts | 4.2% | 3.8% | 3.3% |

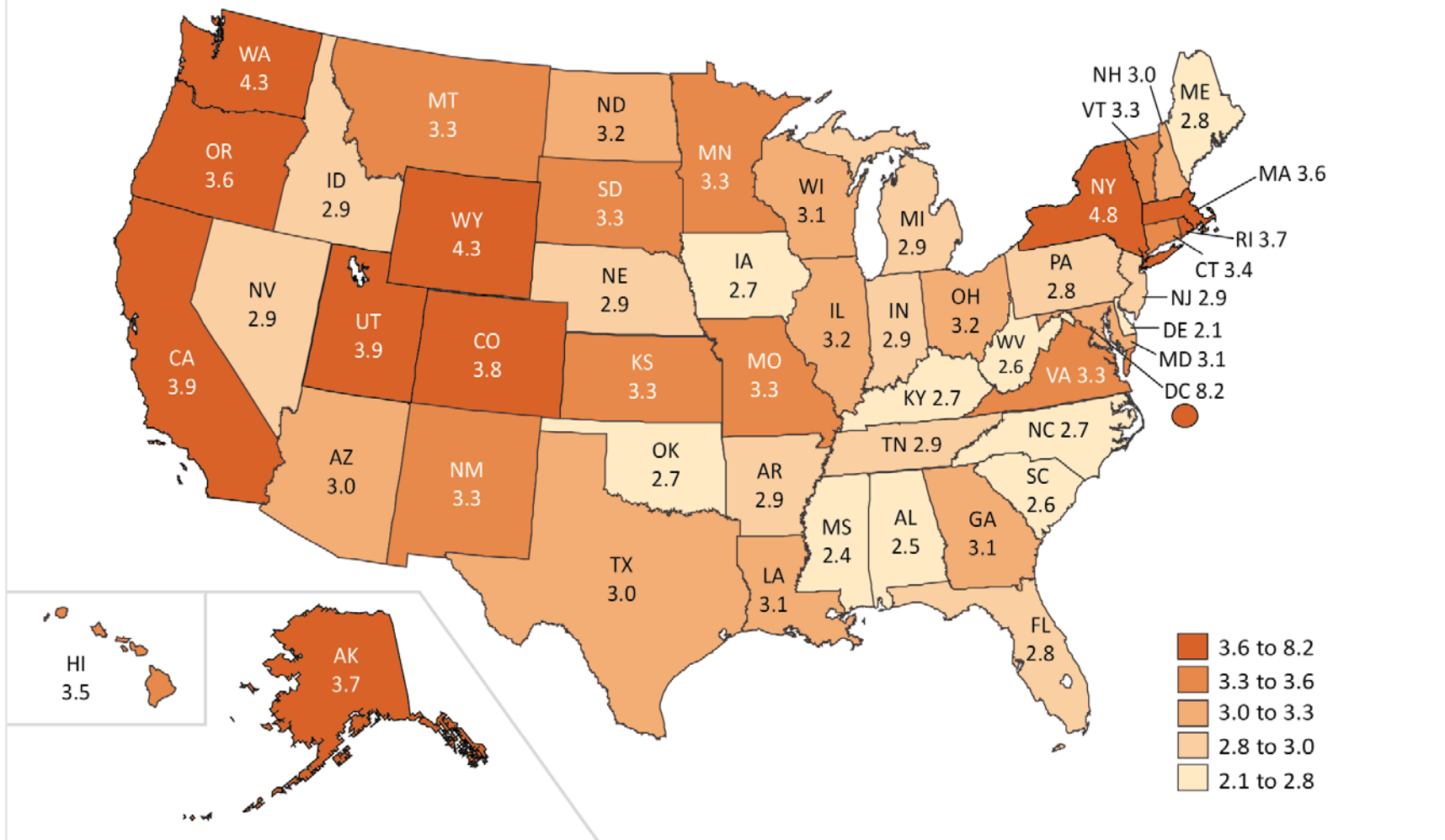
Arts & Cultural Economic Activity as a Percent of GDP by State

Arts and Cultural Value Added: Percent of State Total, 2015



Arts & Cultural Activity Employment as a Percent State Employment

Arts and Cultural Employment: Percent of Total Employment, 2015



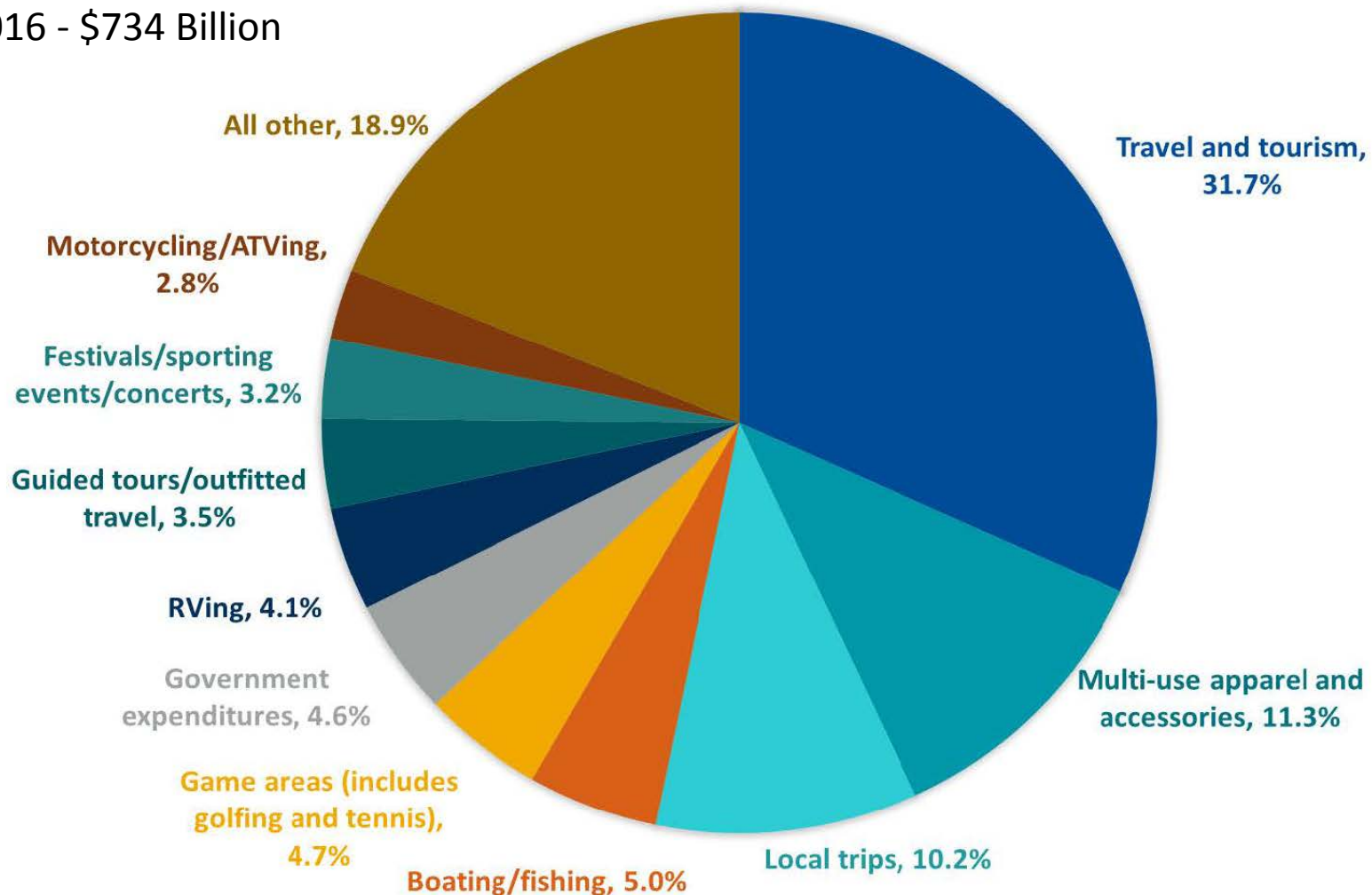
2016 Outdoor Recreation



| | GDP | Compensation | Employment |
|----------|--------------------|-------------------|---------------|
| Total US | \$18,707.2 Billion | \$9,968.9 Billion | 148.7 Million |
| | \$412.0 Billion | \$213.6 Billion | 4.5 Million |
| US Arts | 2.2% | 2.1% | 3.0% |

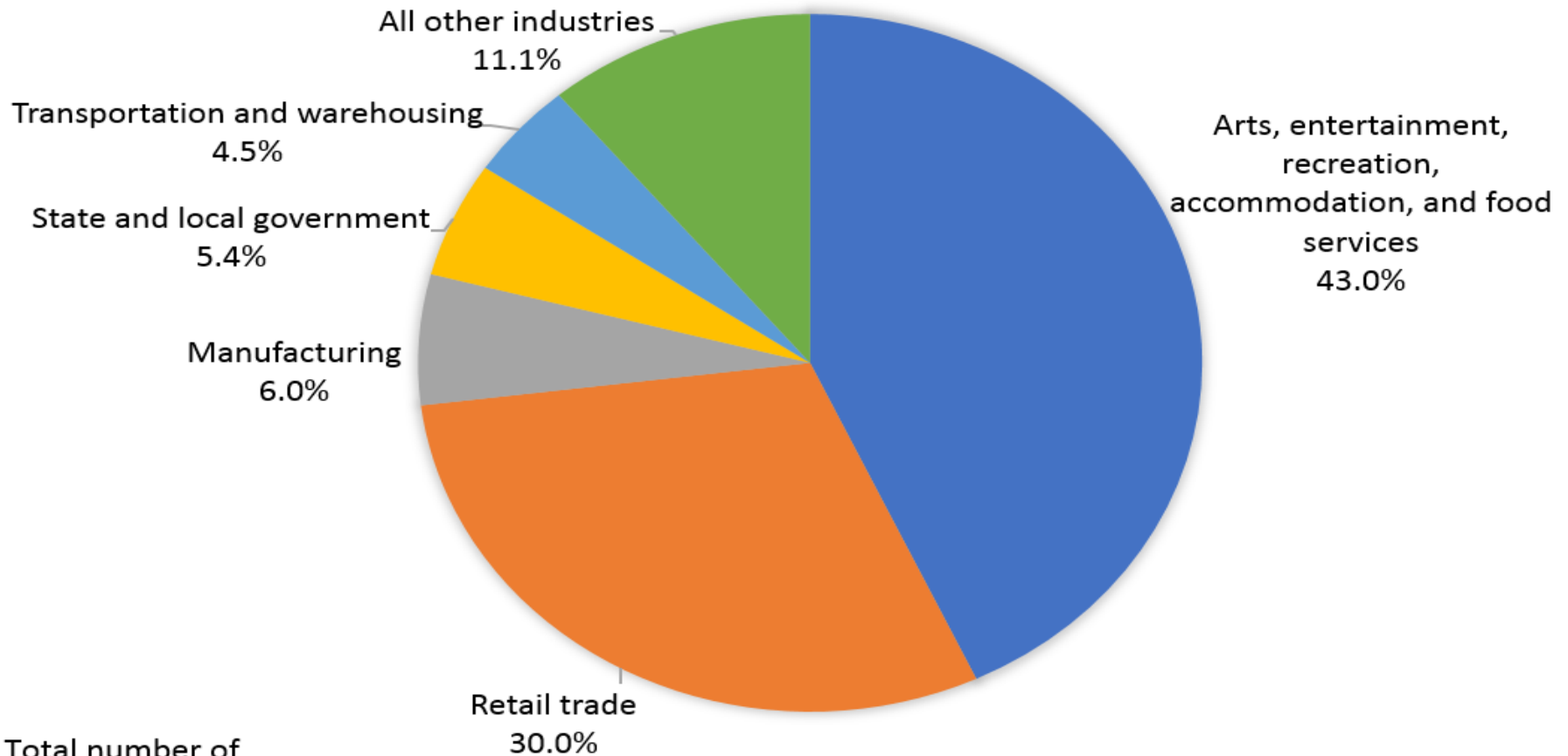
Outdoor Recreation – Gross Output

2016 - \$734 Billion



Outdoor Recreation - Employment

Industry Composition of Outdoor Recreation Employment, 2016



Total number of employees = 4.55 million

Contact Information



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Comments or questions? Send it to us at:

ArtsandCulture@bea.gov

OutdoorRecreation@bea.gov

Want more info?

Check out the ACPSA & ORSA pages at:

www.bea.gov/data/special-topics/arts-and-culture

www.bea.gov/data/special-topics/outdoor-recreation

Prototype Domestic Product by County Statistics

2019 Goldschmidt Data Immersion Workshop

February 27, 2019



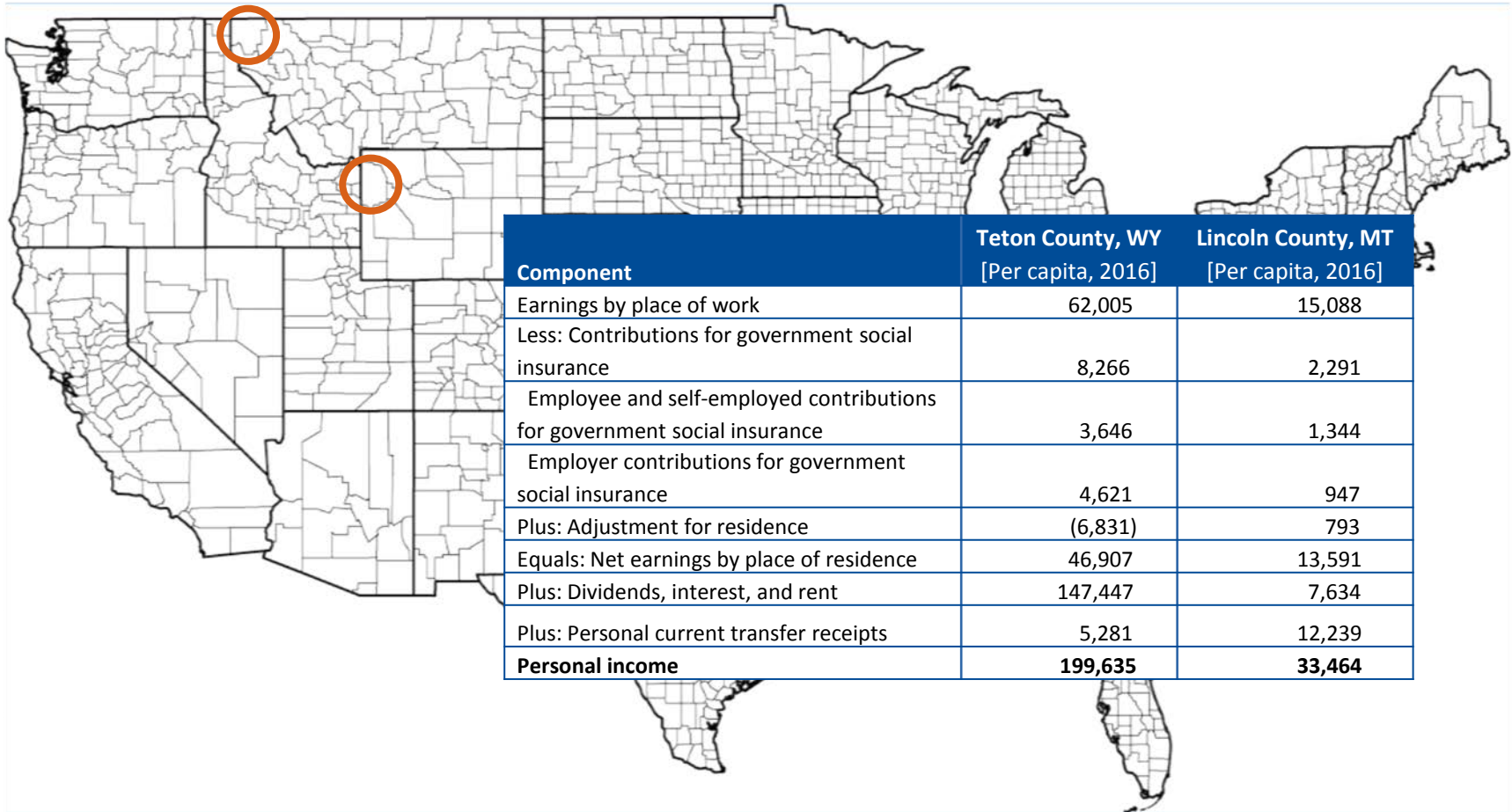
- Background and motivation
- Source data and methodology
- Overview of prototype statistics
- Analysis
- Next steps

- BEA publishes personal income statistics for the nation, states, metropolitan areas, and counties. Statistics available at the county level:
 - Annual frequency, 1969 - forward
 - By component and industry
- BEA also publishes GDP statistics for the nation, states, and metropolitan areas
- On December 12, 2018, BEA released prototype GDP by county statistics

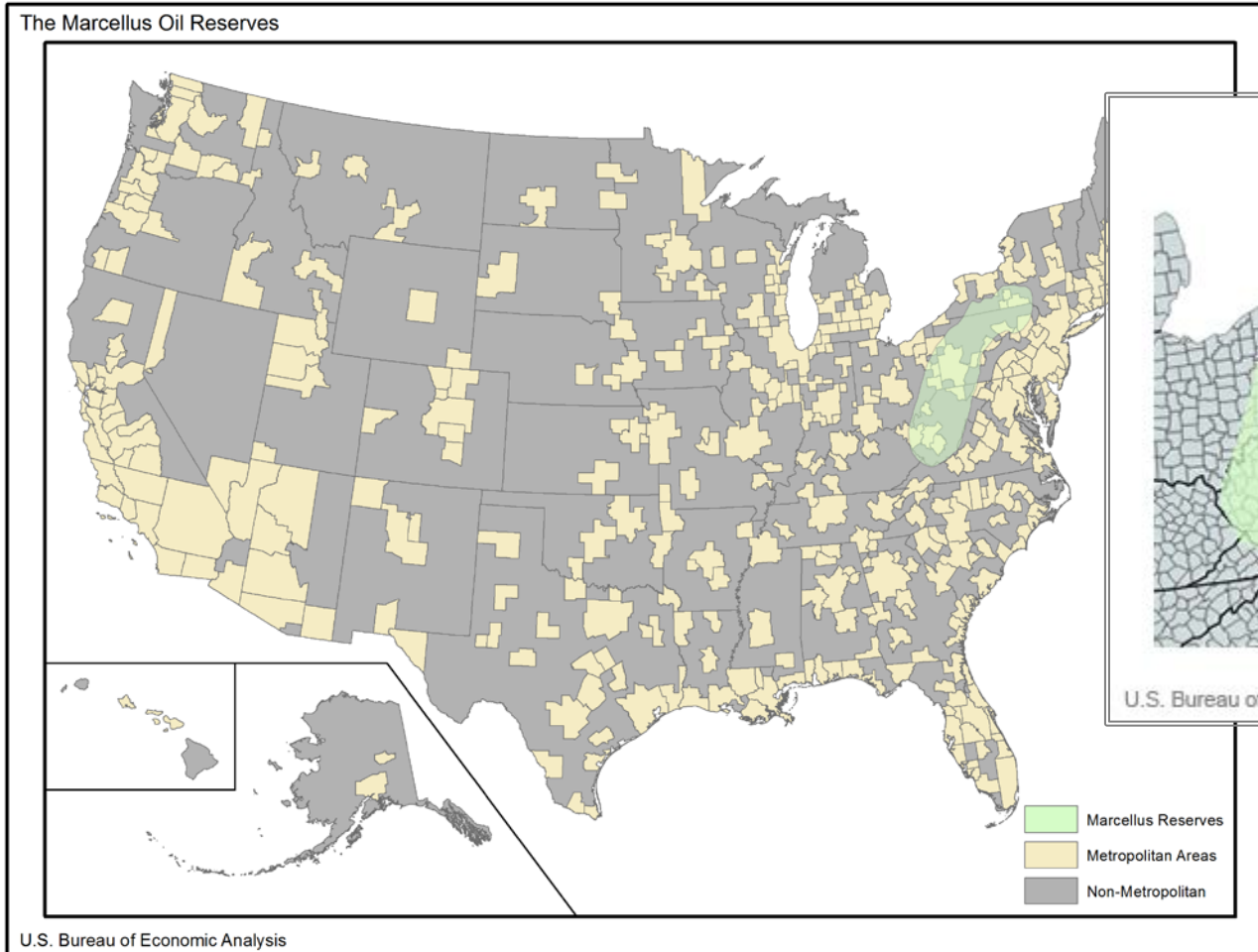
Relation of Personal Income to GDP

| | GDP | Personal Income |
|--|-----|-----------------|
| Wages and salaries | ✓ | ✓ |
| Proprietors' income | ✓ | ✓ |
| Employer contributions for employee pension and insurance funds | ✓ | ✓ |
| Contributions for government social insurance | ✓ | ✓ |
| Corporate income | ✓ | |
| Taxes on production and imports less subsidies | ✓ | |
| Receipts on assets (dividends, interest) | | ✓ |
| Transfer receipts (Social Security benefits, Medicare, Medicaid) | | ✓ |
| Place of work | ✓ | |
| Place of residence | | ✓ |
| Accrual basis | ✓ | ✓ |
| Disbursement basis | | ✓ |

County Personal Income



Oil Reserves



- What is the size of a local area's economy?
- Is it growing or declining? What has been its growth trend over time?
- What industries are driving growth?
- How does its growth compare to growth in other local areas, with the state, with the Nation?

- Provide a much richer picture of the geographic distribution of the nation's economic activity
 - Assist analysts in the assessment of local economic performance
 - Inform resource allocation decisions
 - Assist planners and policymakers in the development of strategies that promote economic growth and in the assessment of strategies over the long run
- Inform and lead to improvements of GDP by metropolitan area statistics and GDP by state statistics

- Release date: December 12, 2018
- Data series: Annual current- and inflation-adjusted GDP statistics for all counties (3,113)
- Industry detail:
 - All industry total
 - Private goods-producing industries
 - Private services-producing industries
 - Government
- Period: 2012-2015

- GDP by state:

$$GDP = COMP + GOS + (TOPI - SUB)$$

- In the current methodology for GDP by metropolitan area:

$$Allocator_{i,cty} = f(earnings_{i,cty})$$

- In the proposed methodology for GDP by county:

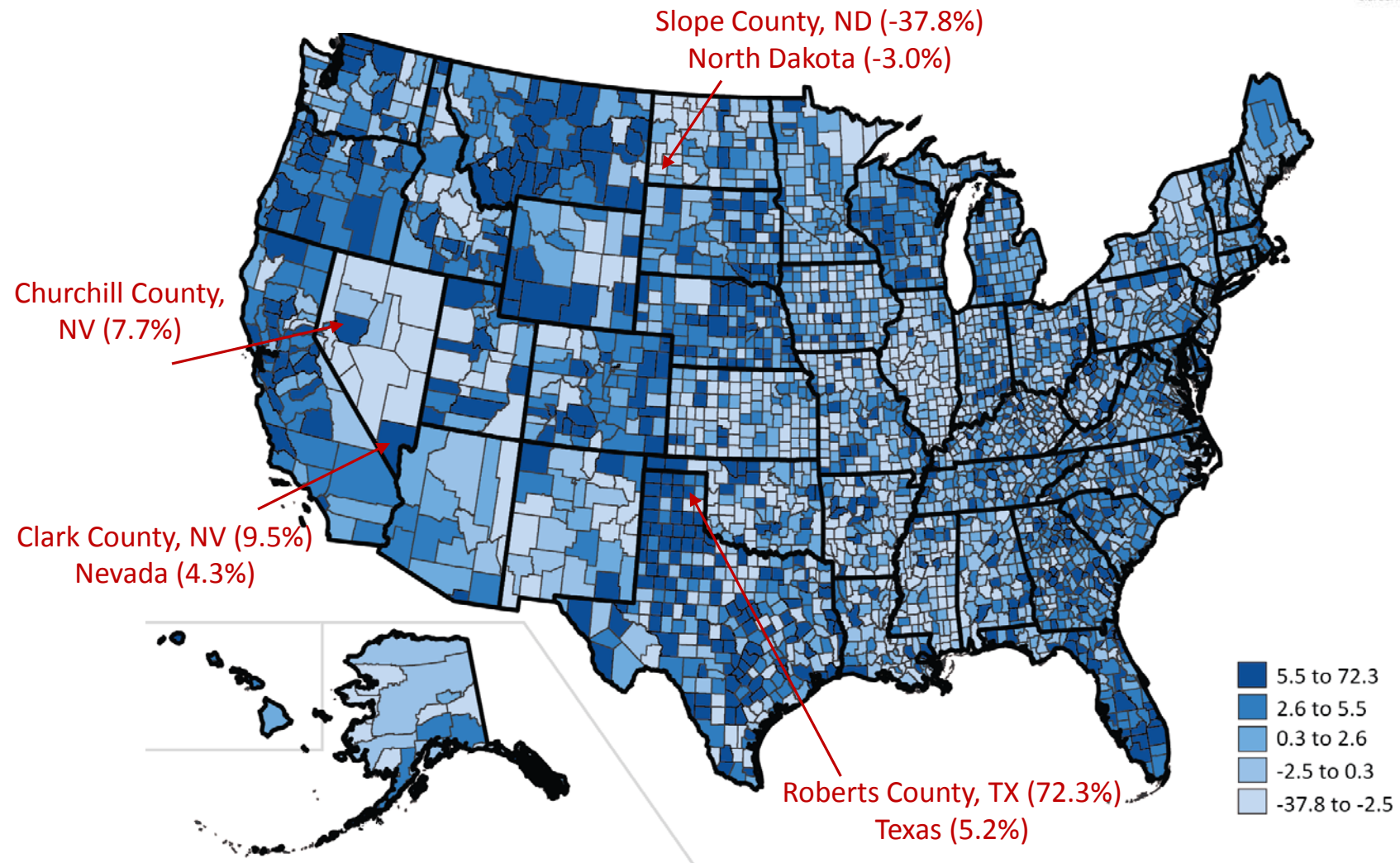
$$Allocator_{i,cty} = f\left((earnings_{i,cty}), (other\ source\ data_{i,cty})\right)$$

- GDP by state
- County earnings by industry
 - Quarterly Census of Employment and Wages (QCEW)
 - Statistics of Income (SOI)
- Economic Census
- National Establishment Time-Series (NETS) Database
- Farm: U.S. Department of Agriculture (USDA)
- Banking: Federal Deposit Insurance Corporation (FDIC)
- Utilities: Energy Information Administration (EIA)

Corroboration Sources

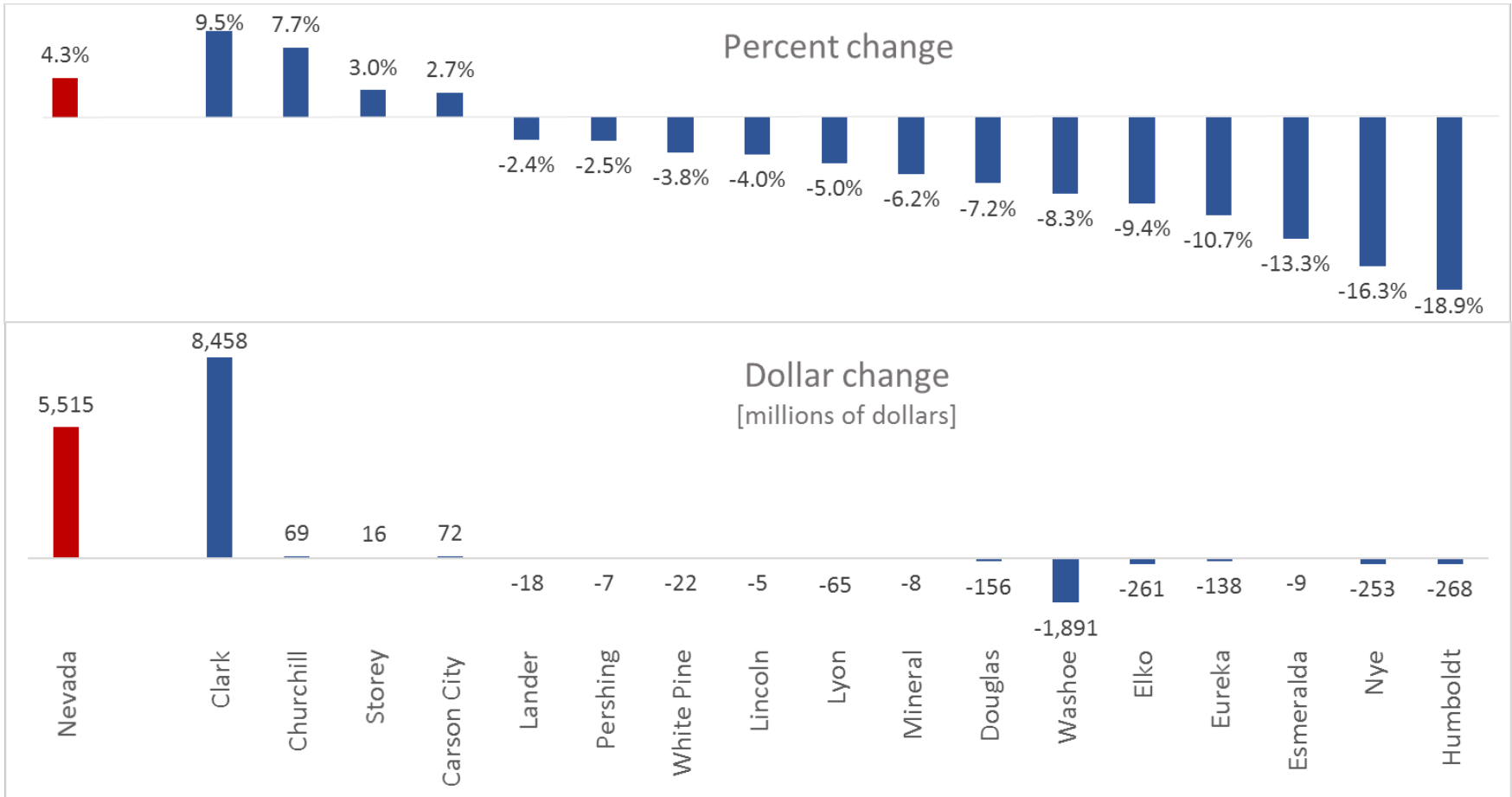
- NETS database
- IncentivesMonitor.com Database
- The State Business Incentives Database
- The State Development Program Expenditures Database
- Conway Data's New Plant Database
- Mining: Energy Information Administration (EIA), Drilling Edge

Percent Change in Real GDP by County, 2014-2015



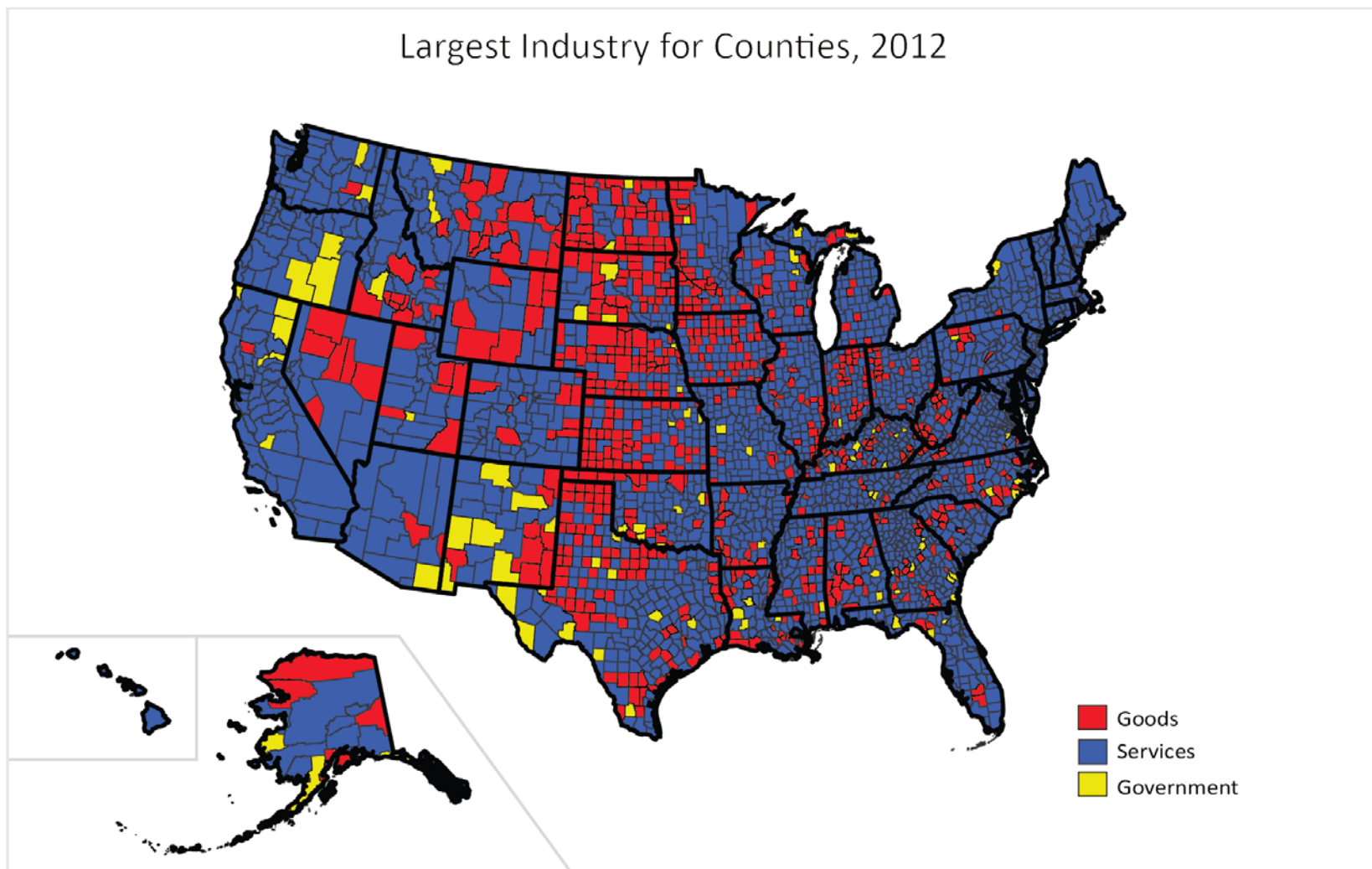
J.S. Bureau of Economic Analysis

Real GDP by County Growth in Nevada, 2014-2015



Industry Composition

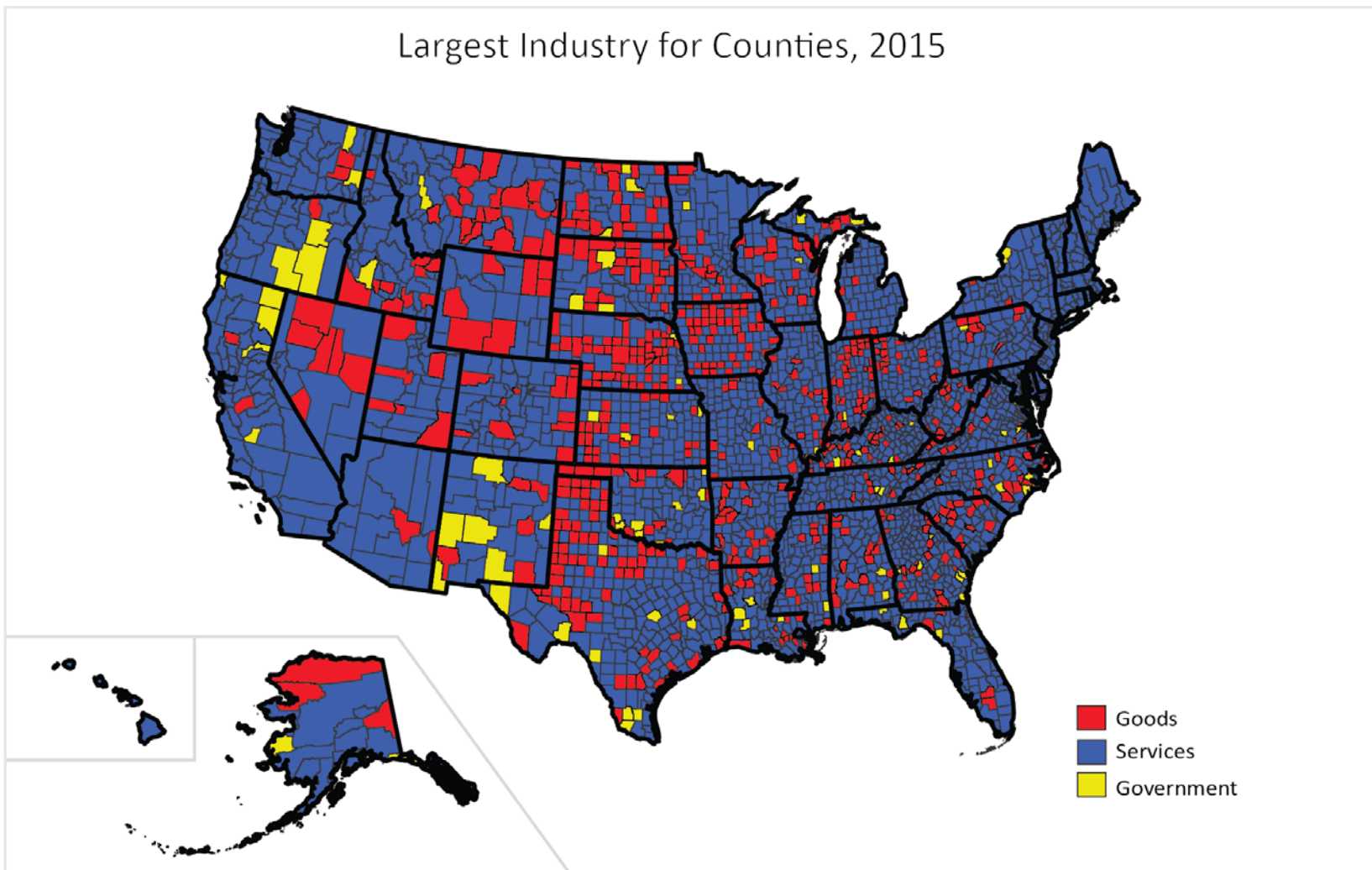
Largest Industry for Counties, 2012



U.S. Bureau of Economic Analysis

Industry Composition

Largest Industry for Counties, 2015

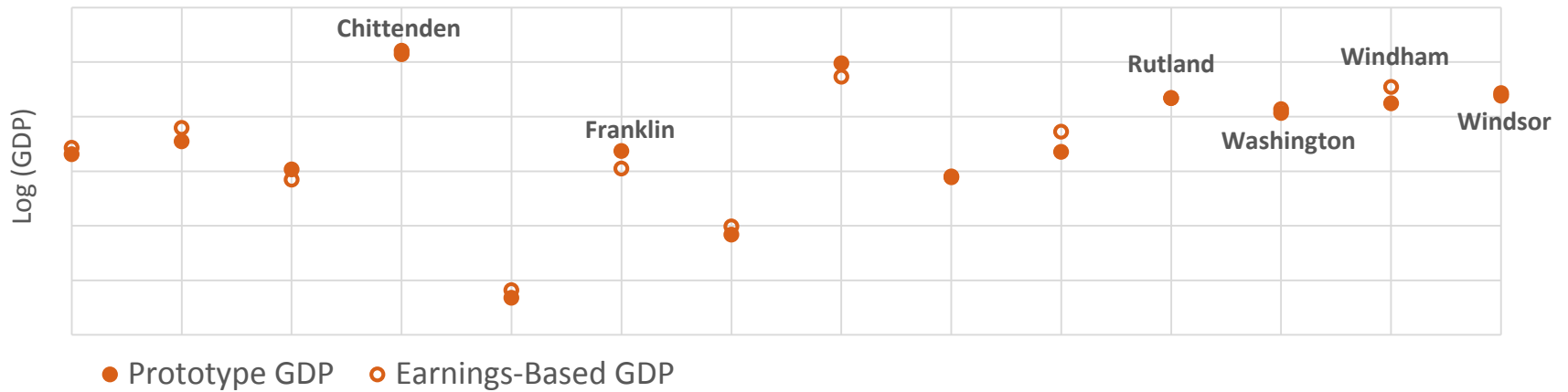


U.S. Bureau of Economic Analysis

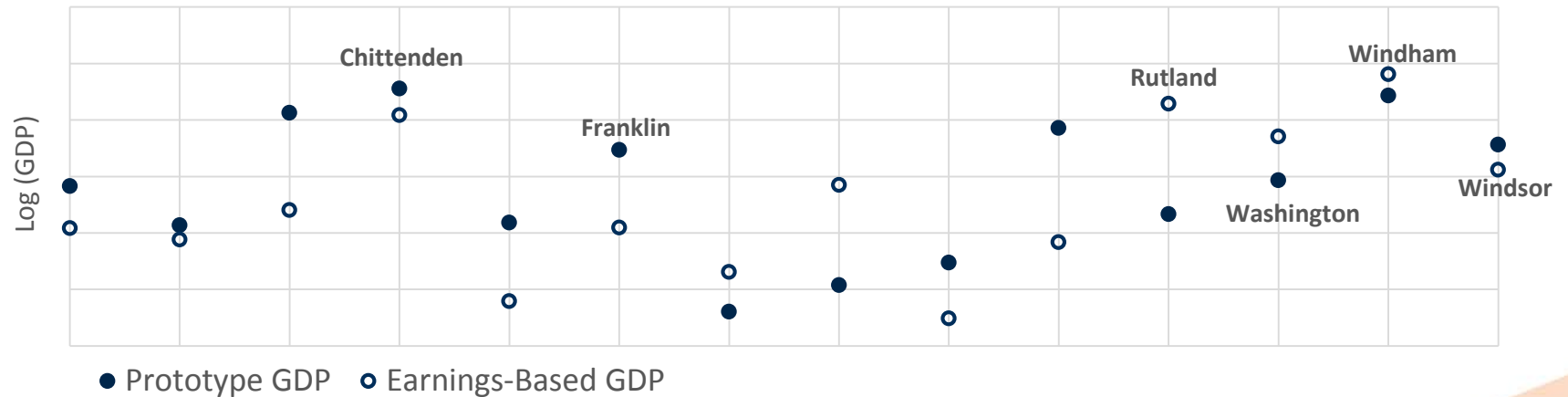
Key Improvements

- More accurate geographic allocation of industry output, particularly for capital intensive industries
- More accurate identification of economic turning points
- Lower suppression rates

Accommodations and Food Services

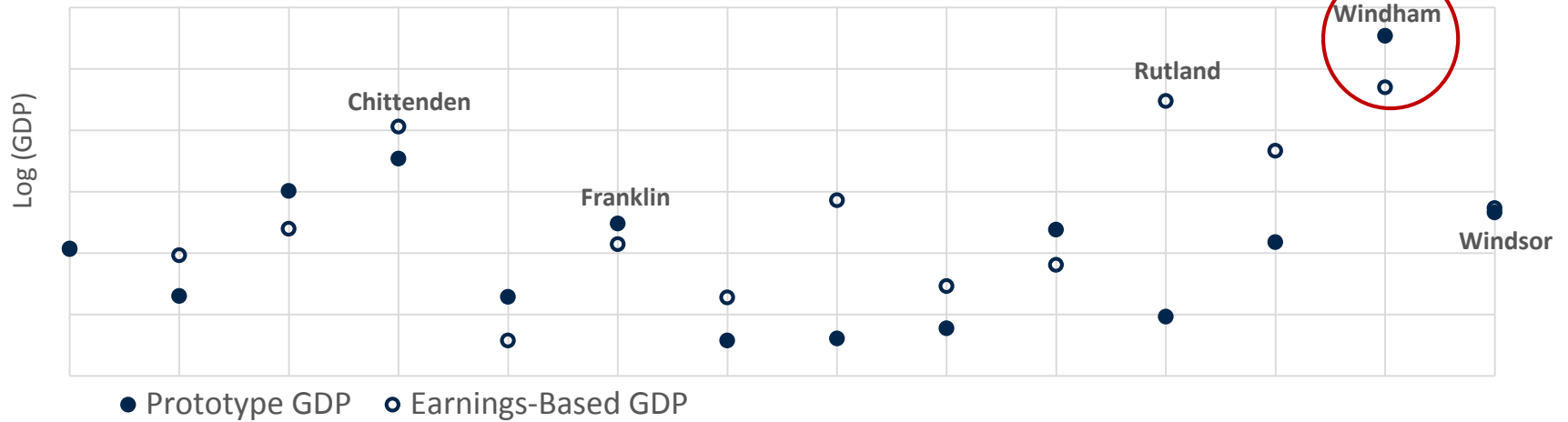


Utilities

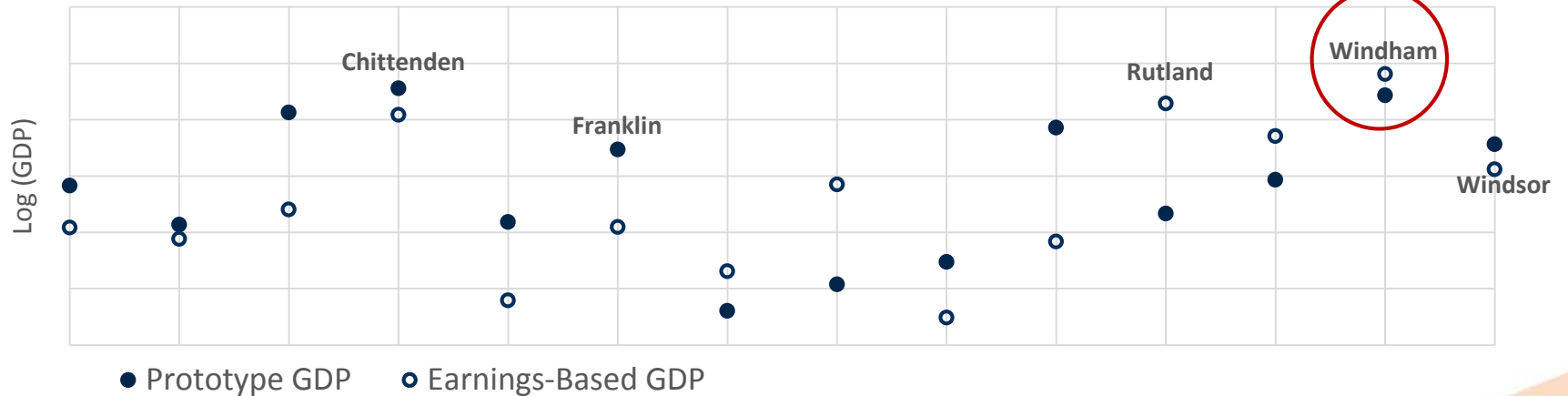


Vermont Counties, Utilities

2013

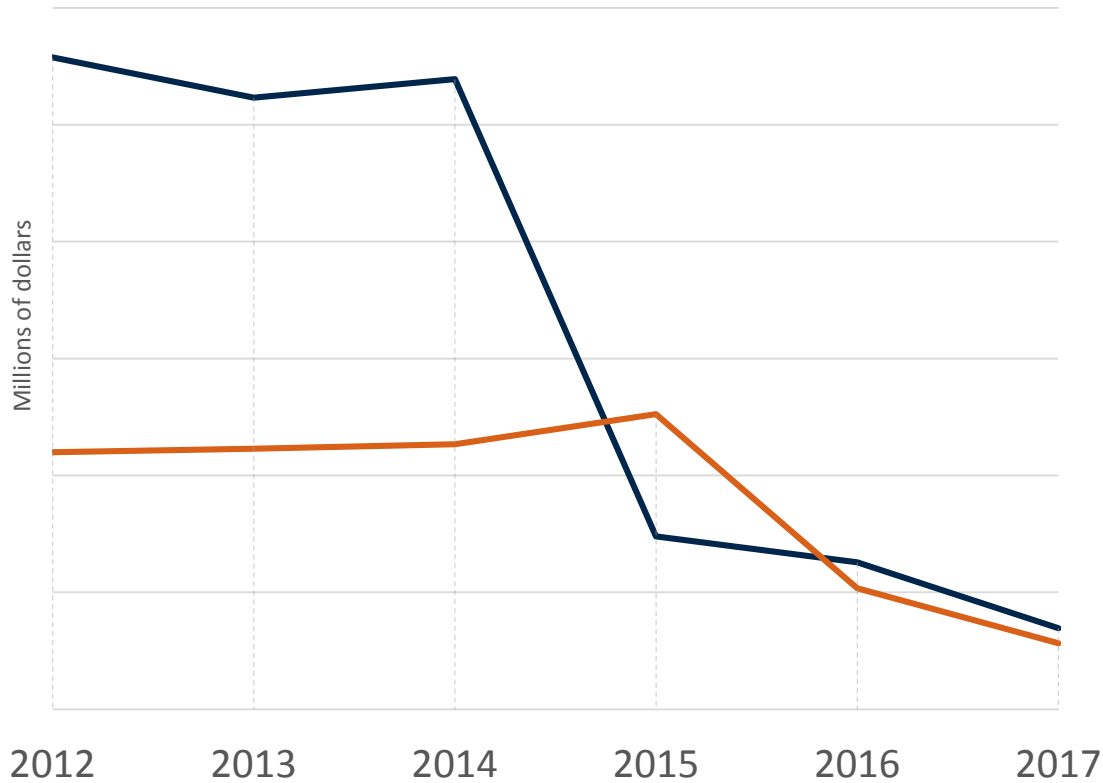


2015

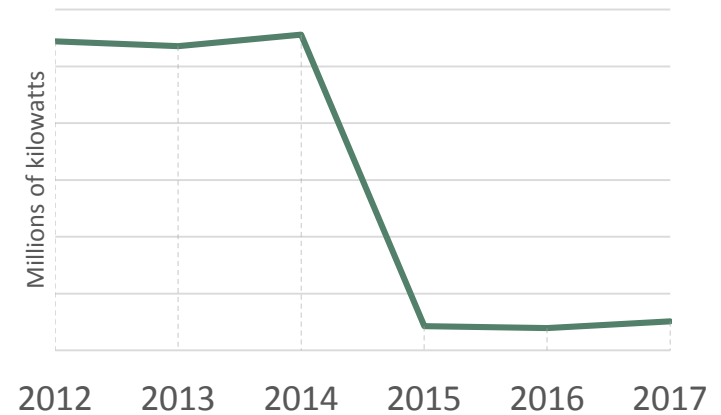


Windham, VT: Utilities

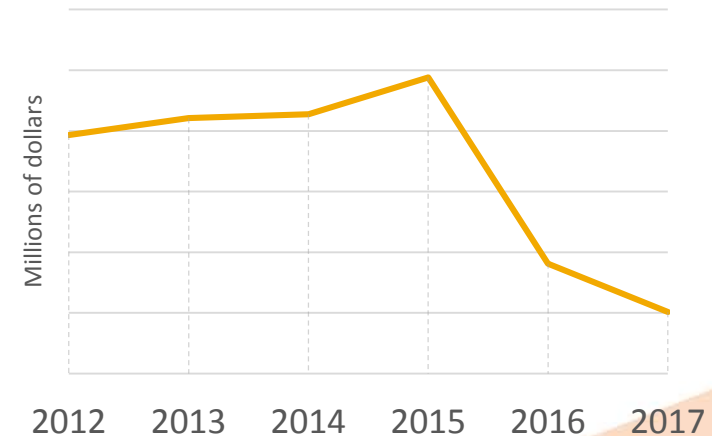
— Prototype GDP — Earnings-Based GDP



EIA Electricity Generation

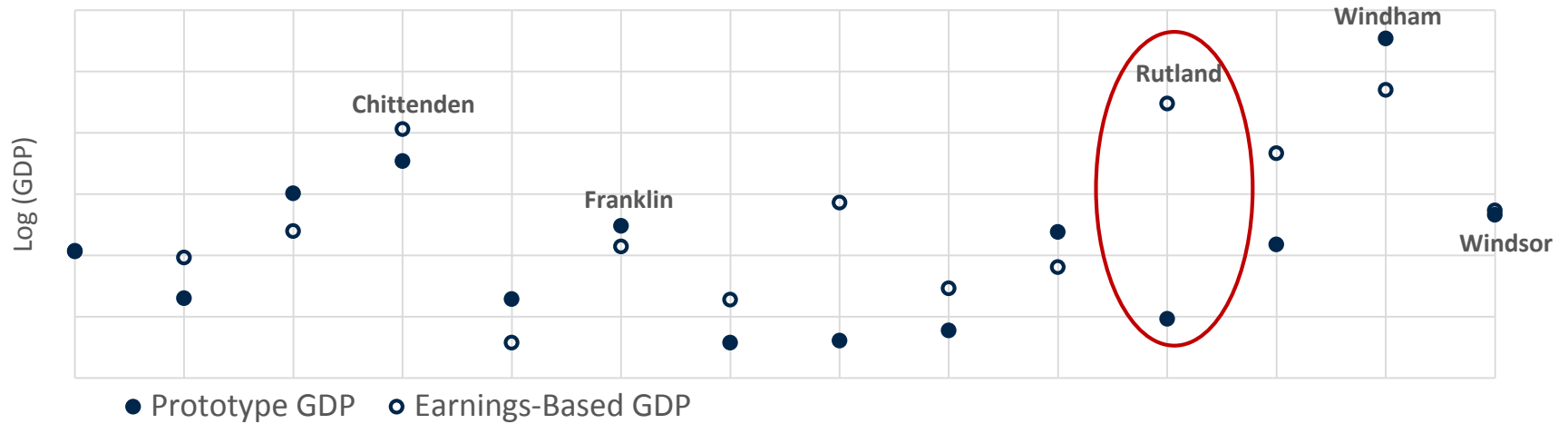


Industry Earnings

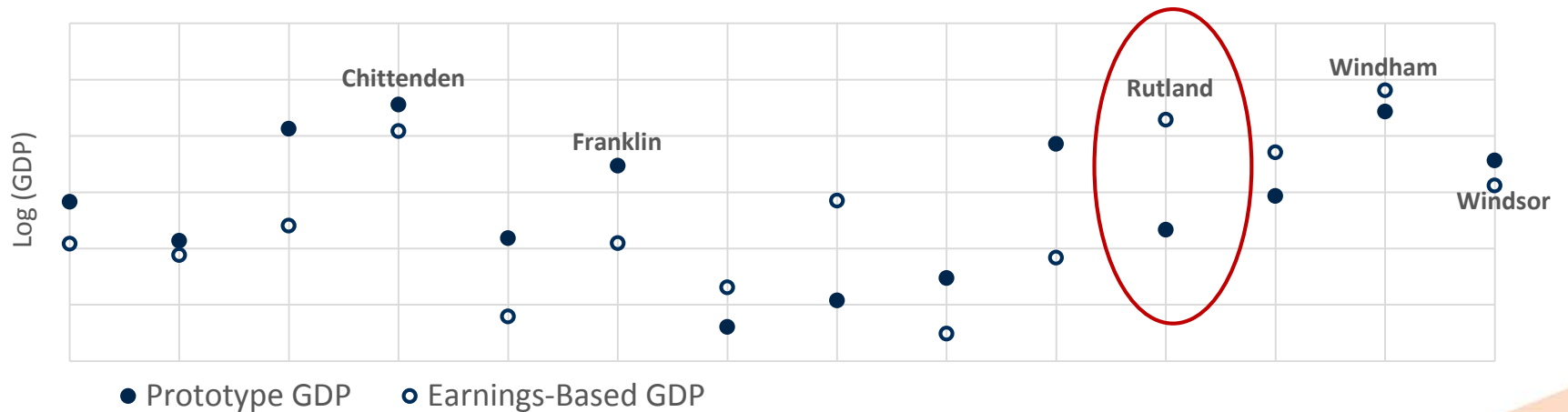


Vermont Counties, Utilities

2013

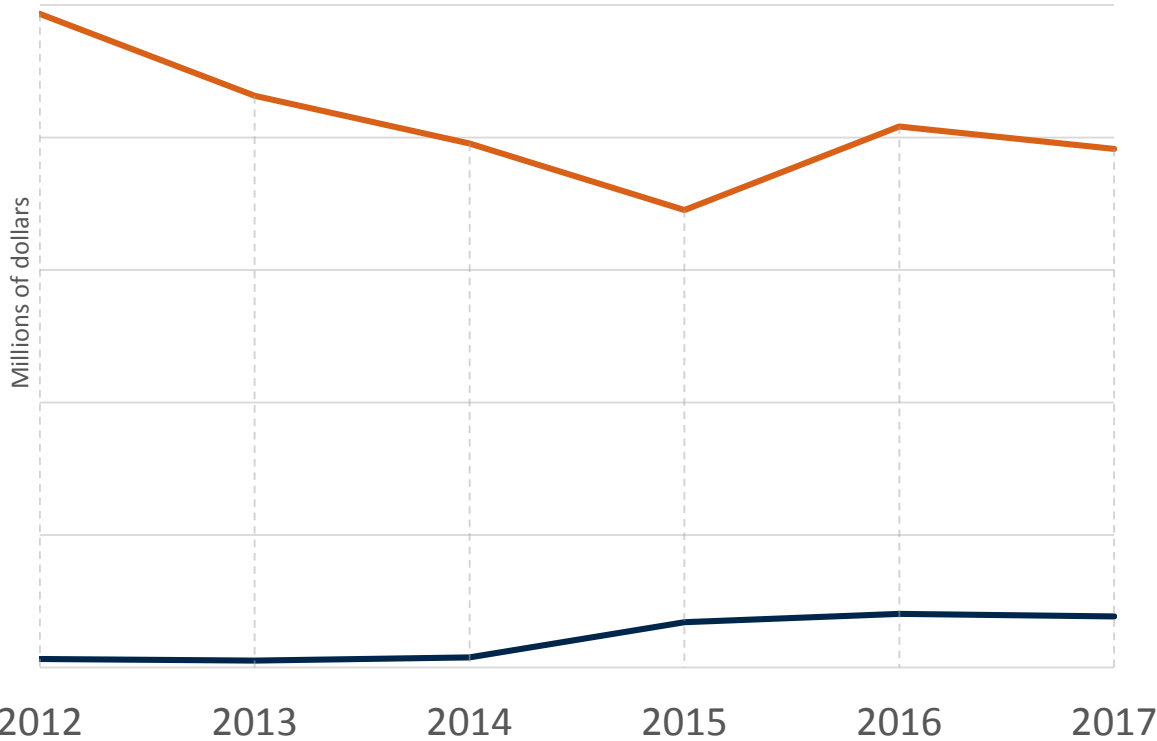


2015

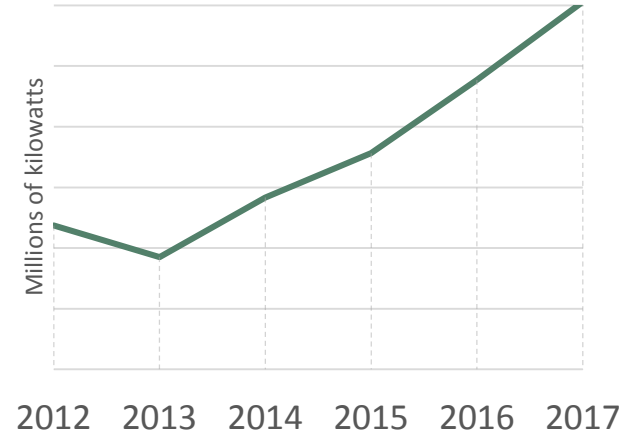


Rutland, VT: Utilities

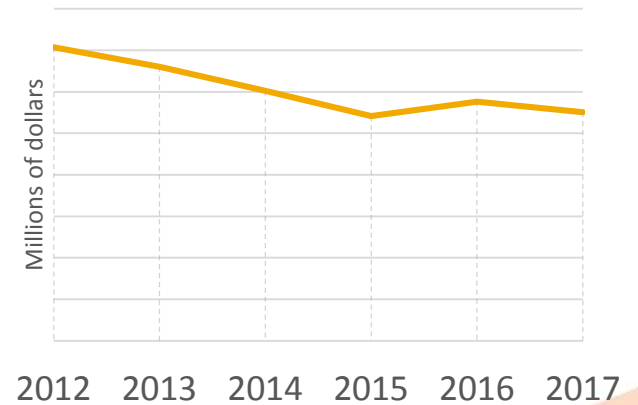
— Prototype GDP — Earnings-Based GDP



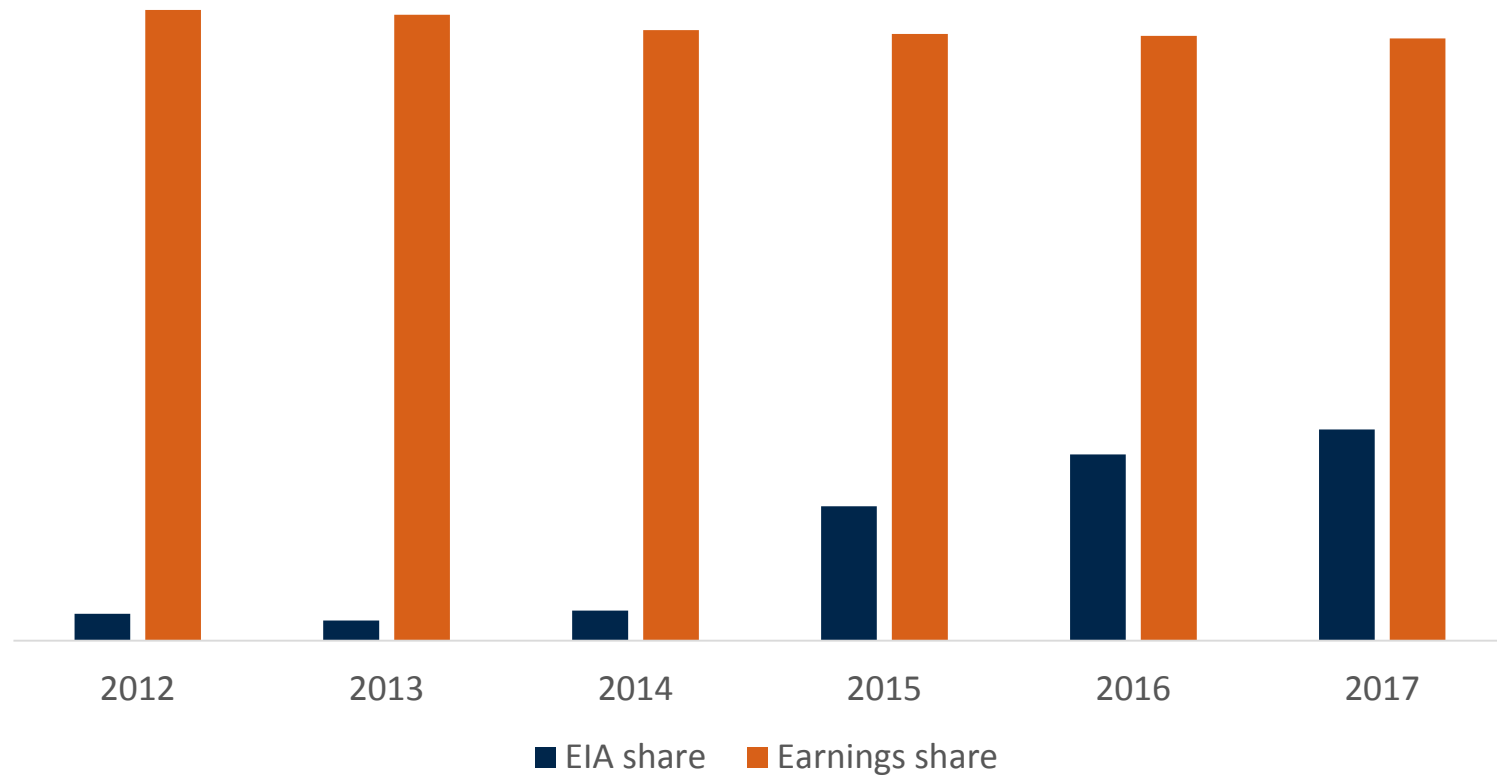
EIA Electricity Generation



Industry Earnings



Rutland's Share of Vermont Utilities Industry



Next Steps

- Develop further improvements and refinements to the prototype statistics
- Analyze suppression patterns and determine the level of industry detail for official release
- Continue to solicit and incorporate data user feedback
- Official release on December 12, 2019

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