

Monthly Retail Trade

Automated Experimental Monthly Productivity Measure for select Retail Trade industries

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Agenda

- Introduction of DIPS
- Motivation for Project
- Process
- Dashboard Demonstration



Introduction of DIPS

- The Division of Industry Productivity Studies produces annual measures for detailed industries, including:
 - ▶ Productivity
 - ▶ Output
 - ▶ Hours
 - ▶ Labor Compensation



Motivation for Project

- Annual measures are robust but not timely
- Monthly measure can yield more timely insights where data are available, and are more feasible using automation
- Data sources can be accessed electronically (API)
- Existing data analysis tool can be expanded



Process



1. Getting the lay of the land and fully understanding multiple data sources was imperative.

■ 4 data sources:

- ▶ Monthly Retail Trade and Food Services (Census API)
- ▶ Advanced Monthly Retail Trade and Food Services (Census API)
- ▶ Deflators (BLS API)
- ▶ Monthly Hours Index (csv)

Economic Indicators (Time Series: various years - present)

DECEMBER 10, 2020



The Economic Indicator Time Series Database is now available via the API.

[Download Guide to Using the Economic Indicators Time Series in the Census API \[PDF - 2.5 MB\]](#)

The U.S. Census Bureau's economic indicator surveys provide monthly and quarterly data that are timely, reliable, and offer comprehensive measures of the U.S. economy.



2. Jupyter Notebook was used primarily for data manipulation

■ This had two benefits

- ▶ Able to keep track of all the code that has been written over the summer
- ▶ Combining markdown and code allows for a smoother process of documentation and handover

1. Pull data from Monthly Retail Trade and Food Services (MRTS)

```
1 #####
2 ### fetching Monthly Retail Trade and Food Services ###
3 #####
4
5 # all information retrieved from https://www.census.gov/data/developers/data-sets/economic-indicators.html
6 # blog that I followed to retrieve data: https://atcoordinates.info/2019/09/24/examples-of-using-the-census-bureaus-api-with-py
7
8 # creating base url in order to build data_url
9 base_url = f'https://api.census.gov/data/timeseries/eits/mrts'
10
11 # bringing in the necessary columns and data from 2017
12 cols = 'cell_value,data_type_code,time_slot_id,category_code,seasonally_adj'
13 time = 'from+2017'
14
15 data_url = f'{base_url}?get={cols}&time={time}&key={api_key}'
16
17 print(data_url)
```

✓ 0.1s

Python

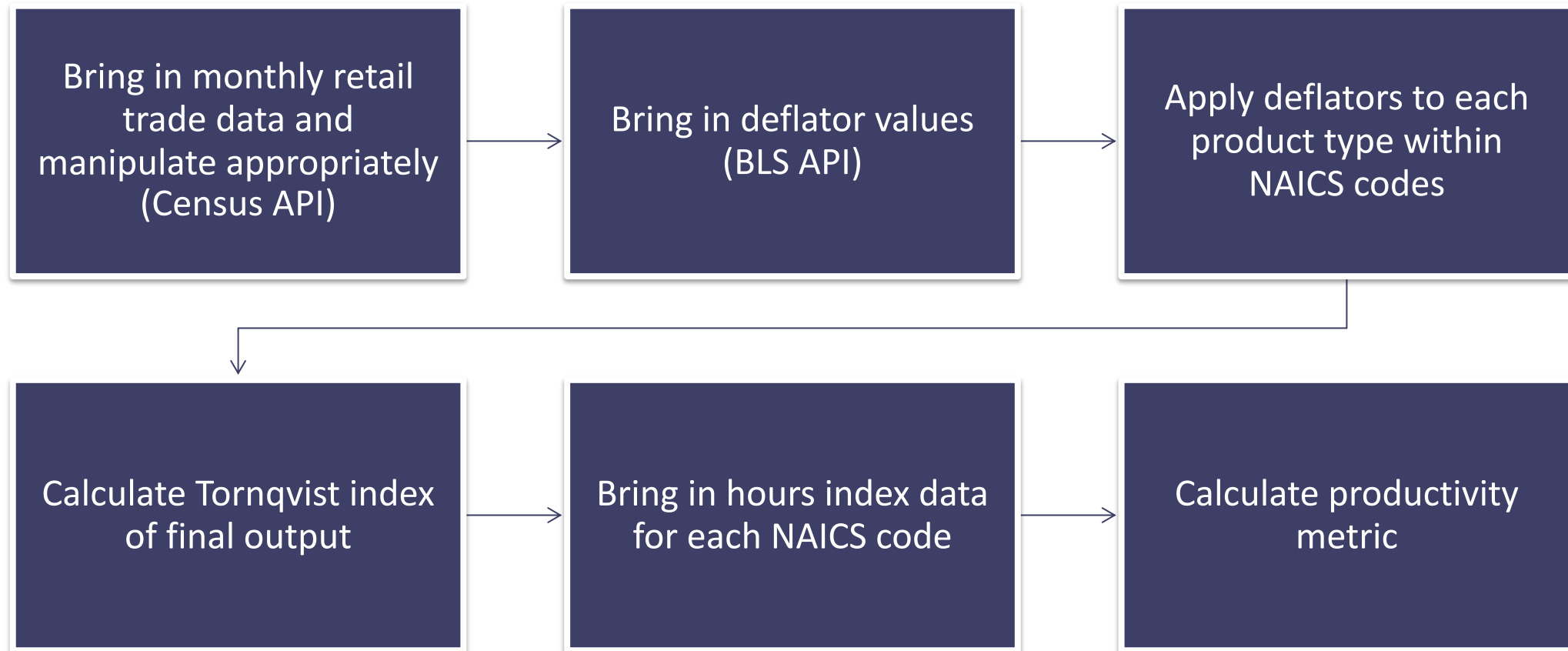
```
https://api.census.gov/data/timeseries/eits/mrts?
get=cell_value,data_type_code,time_slot_id,category_code,seasonally_adj&time=from+2017&key=17cd316b24af2283b20103dc21e14b2a5f0f58b0
```

```
1 df_final = pd.merge(output_final_df_2, hours_index_df, how='left', left_on=['category_code','curr_m
2 df_final['productivity'] = (df_final['output_index'] * 100) / df_final['hours_index']
3 df_final = df_final.drop(columns = ['curr_month','industry','final_calculation'])
4 df_final
```

✓ 0.8s

	category_code	seasonally_adj	cumsum	output_index	year	month	indexed_ms	implicit_price_deflator
0	441	no	0.000000	100.000000	2017	1	100.000000	1.000000
1	441	no	0.048008	104.917878	2017	2	104.962325	1.000424
2	441	no	0.219283	124.518408	2017	3	124.770545	1.002025
3	441	no	0.128617	113.725437	2017	4	114.234408	1.004475
4	441	no	0.209801	123.343309	2017	5	124.000610	1.005329

2. Jupyter Notebook was used primarily for data manipulation



3. Bring in finalized dataset to existing dashboard

- All the work was done in python and powered by Streamlit, which helps create web app for data science and visualization.

```
C:\Users\yum_e\Documents\Git\update-analysis-tool > app.py > ...
1  # -*- coding: utf-8 -*-
2  """
3  Created on Fri Jun 25 12:09:11 2021
4
5  @author: jerin
6  """
7  import streamlit as st
8  import pandas as pd
9  from importlib import import_module
10
11  import data
12  import pages
13  import widgets
14
15  # =====
16  # Set page configuration
17  # =====
18  APP_NAME = "DIPS Analytics"
19  LOGO_IMAGE = "images/app_logo.png"
20
21  st.set_page_config(page_title=APP_NAME, page_icon="images/app_logo.png",
22
23  # Associate each page string with its script
24  pages = {i: import_module(f"pages.{i}") for i in pages.__all__}
25
26  # Get updates
27  update_options = ["Select Update"] + data.bls.get_update_options()
28
29  # Customize the types of tools available for each update
30
31  update_tools_df = pd.read_csv("update_tools.csv")
32  update_tools = {}
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Dashboard Demo





Division of Industry Productivity Studies

Navigation

- ☒ Home
- ☐ Analysis
- ☐ Release Notes

Pre-release data disabled.



DIPS Analytics

Purpose

The purpose of this project was to create a tool that quickly analyzes DIPS data. Users are able to select between types of analysis that are bread and butter to our division, including industry contributions, outliers, revisions, and more. Many of these tasks are repeated multiple times each year and each update, and this web application automates these calculations to save hours of time.

Contribute

This is an open source project and you are very welcome to **contribute** your own code or comments in [GitLab](#).

Please report bugs or feature requests in the [Issues](#) section.

About

This project was created and is maintained by:

- Jerin Varghese
- Christian Cmehil-Warn
- Simon Pastor

Special thanks to Jooyoung Hartzell for her help with deployment.





Division of Industry
Productivity Studies

Navigation

- ☐ Home
- ☒ Analysis
- ☐ Release Notes

Pre-release data disabled.

Update:

Select Update ▼



DIPS Analytics

Please select an update.





Select Update

All

Labor

Manufacturing

Mining

Services

Trade

Monthly Retail

Monthly Retail

Analysis:

Select Analysis



DIPS Analytics

Please select an analysis tool.





Division of Industry Productivity Studies

Navigation

- ☐ Home
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- ☐ Release Notes

Pre-release data disabled.

Update:

Monthly Retail

Analysis:

Select Analysis

Select Analysis


Measure Breakdown



DIPS Analytics

Please select an analysis tool.





Division of Industry Productivity Studies

Navigation

- ☐ Home
- ☒ Analysis
- ☐ Release Notes

Pre-release data disabled.

Update:

Monthly Retail

Analysis:

Measure Breakdown

Measure Breakdown

See description.

View the breakdown of our high-level measures into its component measures across time on a monthly basis.

Select industry

447-Gasoline stations

441-Motor vehicle and parts dealers

4411-Automobile dealers

4411, 4412-Automobile and other motor vehicle dealers

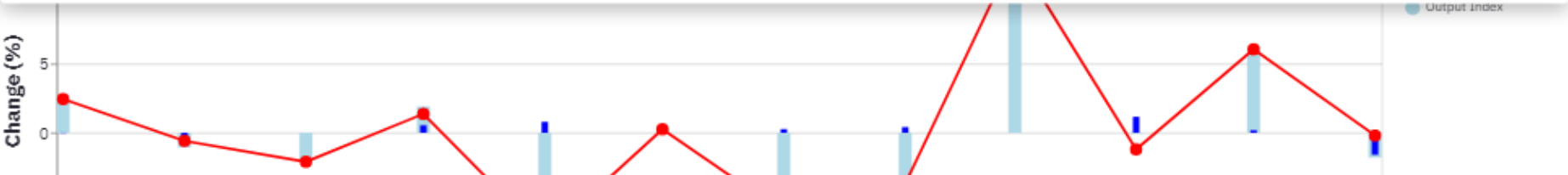
44111-New car dealers

44112-Used car dealers

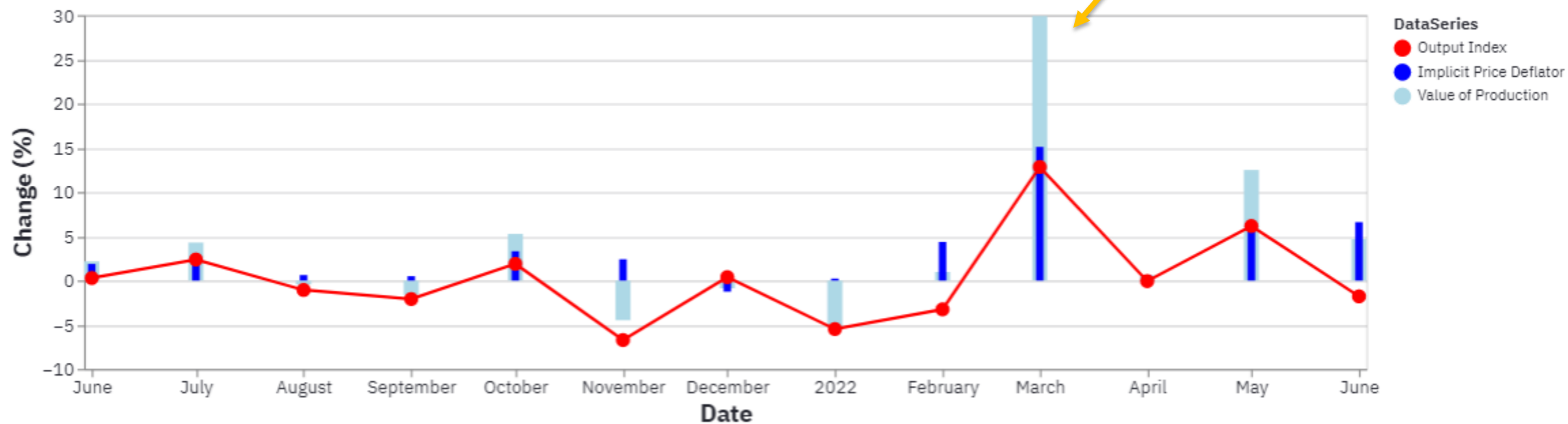
4412-Other motor vehicle dealers

4413-Automotive parts, accessories, and tire stores

442-Furniture and home furnishings stores



Output Growth Breakdown



Productivity Index

