| <pre>import os import requests from dotenv import load_dotenv, fi import pandas as pd import matplotlib.pyplot as plt import numpy as np import json</pre> 2. Pulling Data from F def pullFREDdata(series_id: str): """ Pulls data from FRED API | | |
|--|--|--|
| <pre>def pullFREDdata(series_id: str);</pre> | find_dotenv | |
| | FRED API for first three | series |
| accepts arguments series_ID a returns a pandas dataframe w | and user's APIkey as arguments with date and series_ID values as colu | ımns |
| load_dotenv(path_to_dotenv) 7 | ('.env') # NOTE: You will likely not # NOTE: This often works without any | |
| <pre># payload = {'series ID': ser # 'observation_s</pre> | | |
| <pre>pulled_data = requests.get(Aldata_series_id = pulled_data_series_id = pul</pre> | PIurl)json() | eries_id={series_id}&observation_start=2000-01-01&observation_end=2020-12-31&api_key={apikey}&file_type=json' rdsdatascience.com/how-to-convert-json-into-a-pandas-dataframe-100b2ae1e0d8 |
| <pre>df_series_id = pd.json_normal df_modified = df_series_id.dr</pre> | <pre>lize(data_series_id, record_path = [' rop(columns = ['realtime_start', 'rea</pre> | |
| | | [series_id_dict[series_id]]) #converts the data to numeric data [s_id]].mean()) #replaces nan values with the mean of the column |
| <pre># return df_renamed # else:</pre> | #if the sum of n/a | um() == 0: #checks to see if the sum of n/a values is zero a values is greater than zero, replace with mean |
| # return df_renamed | | es into one Pandas Dataframe |
| <pre>series_id_list = ['GDPC1', 'PAYEN series_id_dict = {'GDPC1': 'Quart</pre> | MS', 'CPIAUCSL', 'CSUSHPINSA','LXXRSA terly Real GDP', rterly Total Nonfarm Employment', | |
| 'LXXRSA': 'S&P, df_merged = pd.merge(pullFREDdata pullFREDdata | 'S&P/Case-Shiller U.S. National Home //Case-Shiller CA-Los Angeles Home Pri a('CPIAUCSL'), ta('GDPC1'), | |
| on = | er') erged, FREDdata('PAYEMS'), e'date', | |
| df_merged_final #final pandas da | | ly CPI, Quarterly Real GDP, and Quarterly Total Nonfarm employment from 2000-01-01 to 2020-12-31 |
| date Quarterly CPI Quarter 0 2000-01-01 169.300 1 2000-02-01 170.000 2 2000-03-01 171.000 | NaN 131 | 1124 596 |
| 3 2000-04-01 170.900 4 2000-05-01 171.200 247 2020-08-01 259.511 | NaN 132 | 888 2105 |
| 248 2020-09-01 260.149 249 2020-10-01 260.462 250 2020-11-01 260.927 | NaN 1418 18767.778 1428 NaN 1428 | 865 545 809 |
| 251 2020-12-01 261.560 252 rows × 4 columns | NaN 1428 | |
| • | | double checking the tabular data is correctly formatted = False) #saves our merged dataframe as a csv |
| df_saved_file date Quarterly CPI Quarter | rly Real GDP Quarterly Total Nonfarm Employm | |
| 0 2000-01-01 169.300 1 2000-02-01 170.000 2 2000-03-01 171.000 3 2000-04-01 170.900 | NaN 131 NaN 1315 | 005 1124 596 888 |
| 4 2000-05-01 171.200 247 2020-08-01 259.511 | NaN 141 | 2105 1149 |
| 248 2020-09-01 260.149 249 2020-10-01 260.462 250 2020-11-01 260.927 251 2020-12-01 261.560 | 18767.778 1428 NaN 1428 | 865 545 809 503 |
| 252 rows × 4 columns 5 Plotting data: | | |
| 3. Scatterplot of two se | all three series overlayed eries | |
| 4. Histogram of one seri 1. Adjusting the plot parameters to 8 in plt.rcParams['figure.figsize'] = | ies nches wide by 4 inches high | |
| 2. Time Series Graph of all three series | s Overlayed an values, we use the interpolate meth | hod to replace these nan values with the |
| <pre>df_saved_file['Quarterly Real GDI fig1, ax1 = plt.subplots() df_saved_file.plot(x = 'date',</pre> | <pre>## P'] = df_saved_file['Quarterly Real G # date values for the x axis # CPI', 'Quarterly Real GDP', 'Quarter'</pre> | GDP'].interpolate(method = 'linear', limit = 3) Cly Total Nonfarm Employment'], #all three series on the y |
| <pre># fig2, ax2 = plt.subplots() # df_saved_file.plot(x = 'date',</pre> | <pre>#date values for the x axis</pre> | |
| # $y = ['Quarter ax = ax2,$ | erly Real GDP'], #all three series o | n the y |
| <pre>plt.ylabel('CPI, Real GDP, Total plt.title('Quarterly CPI, Real GI plt.legend(loc = 'best') plt.savefig('3timeseries.png')</pre> Ouarterly CPI, Real GDP, and Total | Nonfarm Employment(#)') DP, and Total Nonfarm Employment from al Nonfarm Employment from 2000 to 2020 | 2000 to 2020', style = 'italic') |
| 160000 - # 140000 - 120000 - | | |
| P. Total Nonfarm Emp - 00000 - | Quarterly CPI Quarterly Real GDP Quarterly Total Nonfarm Employment | |
| A 40000 - 20000 - 2000 01 01 2004 03 01 2008 05 | 01 2015 | |
| 2000-01-01 2004-03-01 2008-05- Since Nonfarm employment has values in each one individually below: | Time | s in the 10s of thousands and CPI has values in the hundreds, an overlay of these three series does not reflect the best trends of these series from 2000 to 2020. As a result, I have |
| <pre>fig1, ax1 = plt.subplots() df_saved_file.plot(x = 'date</pre> | <pre>[series_id]] = df_saved_file[series_i ', #date values for the x axi</pre> | |
| <pre>y = [series_id ax = ax1, color = color] plt.xlabel('Time') plt.ylabel(series_id_dict[series_id_dict])</pre> | <pre>d_dict[series_id]], #all three serie ries_id])</pre> | es on the y |
| <pre>plt.title(f'{series_id_dict[s plt.legend(loc = 'best') plt.plot() plt.show()</pre> | series_id]} from 2000 to 2020', style | = 'italic') |
| | n Employment from 2000 to 2020 | |
| 150000 - Quarterly Total Nonfarm Employs 145000 - | ment | |
| rly Total Nonfarm E | | |
| 135000 - 2000-01-01 2004-03-01 2008-05- | | |
| <pre>2000-01-01 2004-03-01 2008-05- <figure 0="" 576x360="" axes="" size="" with=""> plotTimeSeries('GDPC1', 'blue') plt.savefig('GDPC1timeSeries.png</figure></pre> | Time | |
| Quarterly Real G | GDP from 2000 to 2020 | |
| 18000 - 17000 - 16000 - | | |
| 15000 - 14000 - | | |
| 13000 - 2000-01-01 2004-03-01 2008-05-0 <figure 0="" 576x360="" axes="" size="" with=""></figure> | 01 2012-07-01 2016-09-01 2020-11-01 Time | |
| plotTimeSeries('CPIAUCSL', 'green plt.savefig('CPIAUCSLtimeSeries.r | en') | |
| 260 - Quarterly CPI | | |
| Ogarterly CP 200 - | | |
| 180 | 2012-07-01 2016-09-01 2020-11-01 | |
| <pre><figure 0="" 576x360="" axes="" size="" with=""></figure></pre> <pre>3. Scatterplots of Two Series</pre> | Time | |
| marke | Quarterly Real GDP', #y axis is r = '.', | Quarterly CPI Quarterly Real GDP |
| | <pre>#Plot in r reterly Real GDP, 2000 to 2020')</pre> | red |
| <pre># df_saved_file.plot.scatter(x =</pre> | 'Quarterly Total Nonfarm Employment' farm Employment vs. Quarterly Real GD | ', y = 'Quarterly Real GDP', marker = '.', color = 'green') DP, 2000 to 2020') |
| | rterly Real GDP, 2000 to 2020 | |
| 전 17000 - 말 | - Same Same : | |
| F 16000 - | الاسمان . الاسمان المساور | |
| 14000 - 14000 - | 220 240 260 uarterly CPI | |
| 14000 - 13000 - 180 200 | | |
| 15000 - 14000 - 180 200 Qu 4. Histogram of one series #histogram df_saved_file['Quarterly CPI'].h: plt.xlabel('Quarterly CPI') | ist(color = 'purple') #plots histogra | um of Quarterly CPI |
| #histogram df_saved_file['Quarterly CPI'].hr plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram) | ist(color = 'purple') #plots histogra y Consumer Price Index, 2000 to 2020' am.png') #saves the histogram as a p | |
| #histogram df_saved_file['Quarterly CPI'].hr plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram) Histogram of Quarterly CPI's plt.savefig('QuarterlyCPIhistogram) | y Consumer Price Index, 2000 to 2020' am.png') #saves the histogram as a p | |
| #histogram df_saved_file['Quarterly CPI'].h: plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram) Histogram of Quarterly CPI') Plt.savefig('QuarterlyCPIhistogram) | y Consumer Price Index, 2000 to 2020' am.png') #saves the histogram as a p | |
| #histogram df_saved_file['Quarterly CPI'].hr plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram Histogram of QuarterlyCPIhistogram Histogram of QuarterlyConsu 4. Histogram of Quarterly plt.xlabel('SuarterlyCPIhistogram) Histogram of Quarterly Consu 4. Histogram of Quarterly plt.xlabel('BuarterlyCPIhistogram) Histogram of Quarterly Consu 4. Histogram of Quarterly plt.xlabel('BuarterlyCPIhistogram) Histogram of Quarterly Consu 4. Histogram of Quarterly plt.xlabel('QuarterlyCPIhistogram) Histogram of Quarterly Consu 4. Histogram of Quarterly plt.xlabel('QuarterlyCPIhistogram) | y Consumer Price Index, 2000 to 2020' am.png') #saves the histogram as a p umer Price Index, 2000 to 2020 | |
| #histogram df_saved_file['Quarterly CPI'].h: plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram Histogram of Quarterly Consu Absolute to the plant of the plant of the plt. Histogram of Quarterly Consu Ouarterly Consu Quarterly Consu Ouarterly Consu Ou | y Consumer Price Index, 2000 to 2020' am.png') #saves the histogram as a p | ong file |
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| 4. Histogram of one series #histogram df_saved_file['Quarterly CPI'].h: plt.xlabel('Quarterly CPI') plt.ylabel('Frequency') plt.title('Histogram of Quarterly plt.savefig('QuarterlyCPIhistogram) Histogram of Quarterly Consu Histogram of Quarterly Consu 6. Pulling data for two I chose to compare data from the S&P/Ca # pullFREDdata('QTAXTOTALQTAXCATA | y Consumer Price Index, 2000 to 2020 am.png') #saves the histogram as a p Imer Price Index, 2000 to 2020 Imer Price Index, 2000 to 2020 O more series of my che ase Shiller U.S. National Home Price Index to ISCANO', FRED_key) BY C'(CSUSHPINSA'), #merges the US nat #with the LA Home #both da # merge adds t | OOSING the S&P/Case Shiller Los Angeles, CA Home Price Index. Lional Nome Price Index dataframe |
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