US Macroeconomics Index Appraisal Project

Introduction

The spread of the epidemic has led to huge impacts across the globe. In this article, we are especially interested in evaluating U.S. macroeconomic conditions before and after the pandemic period. We have chosen GDP, unemployment rate, consumer loans, and Federal Reserve Fund rate as the indices to discern the effect brought by Covid-19.

Summary and Analysis of Data

The pandemic period started in March 2020 according to the time WHO announced and recognized Covid-19 as a pandemic. To compare the economic data before and after the pandemic, we focused on data between July 2018 to July 2022 from Fred, equally two years before and after 2020. For data extraction, we use a third-party library fredapi in Python to import data from Fred. For the third libraries part, we use NumPy, Pandas, and Matplotlib to help us analyze and visualize the data.

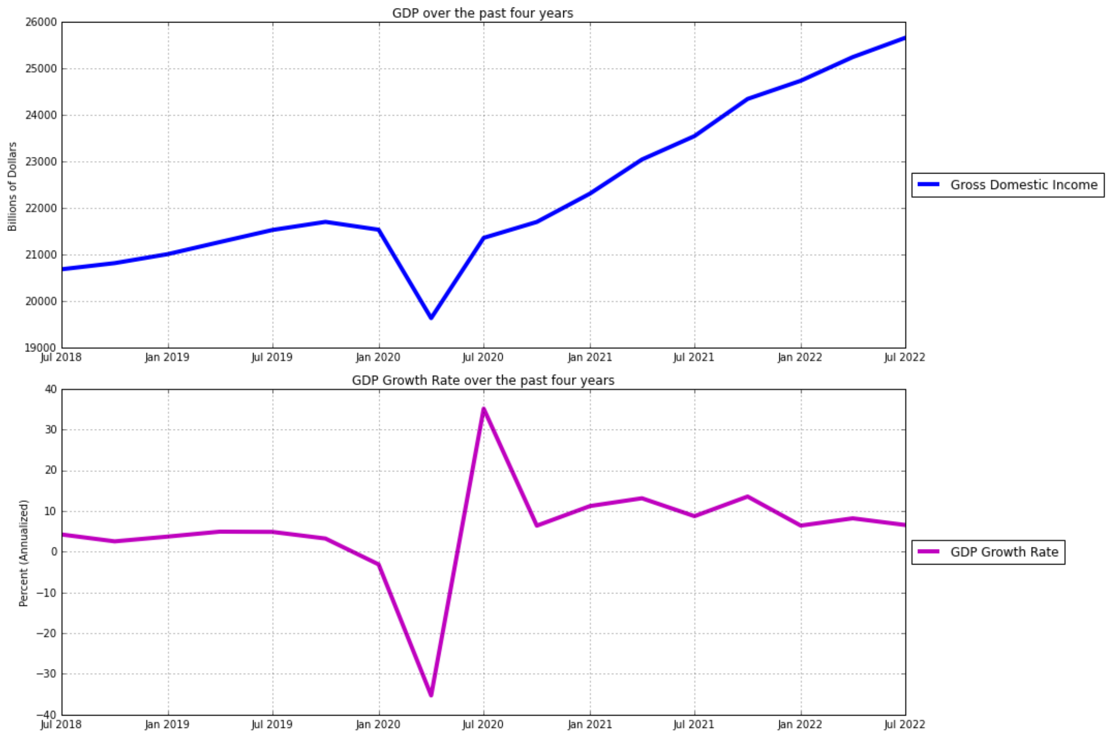
GDP:

Data Collection

GDP is one of the most important metrics for evaluating the economic activity, stability, and growth of goods and services in an economy. For the GDP measurement, we choose GDP with the seasonally adjusted annual rate. Also, we have chosen three sub-majority sectors of GDP: Business, Household, and Government, referring to the expenditure approach where GDP=C+I+G; the business sector acts as the sellers' role in the market for goods and services, the household sector acts as a role of consumer, and the government sector provides services such as financed through taxes or other government spending contributions to the overall economy. This section data series (GDP; GDP: Business; GDP: Household; GDP: Government) was collected from FRED(series I.D A195RC1Q027SBEA, A193RC1Q027SBEA, A765RC1Q027SBEA). Data were collected from July 2018 to July 2022, reflecting changes in GDP, and three sub-sectors of Business, Household, and Government before and after the epidemic.

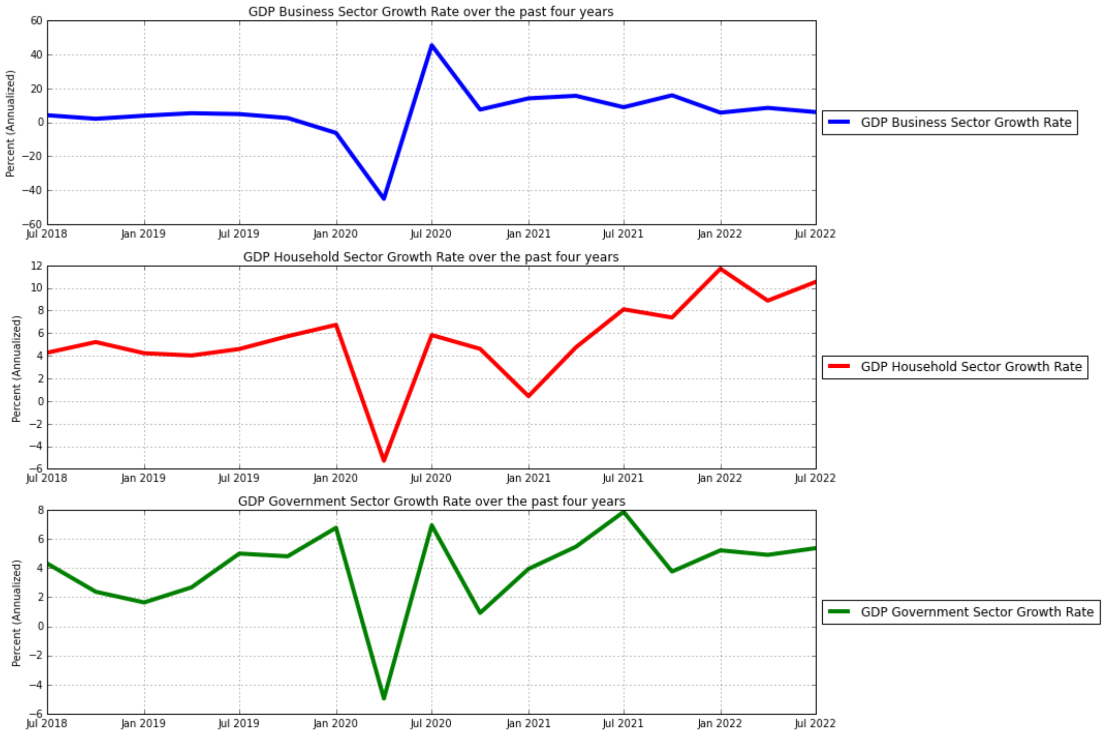
Data Summary and Analysis

In the past four years, from July 2018 to July 2022, GDP has a significant growth level from an absolute number of 21531.839 to 25663.289 billion dollars. It is also apparent to see that GDP had suffered a dramatic decrease to the lowest point of 19636.731 billion dollars between January 2020 to April 2020 due to the pandemic's suffering. With a comparision of data in April 2019, April 2021, and April 2022, GDP displays a loss of 1635.717, 3913.689, and 6026.558 billion dollars. In the first quarter of 2020, the GDP growth rate experienced a significant decline to -35.31%. Then in the second quarter, GDP subsequently reached a boost with an annual growth rate of 35.15%, indicating a turning point of the economy from recession to recovery. Similarly, in the pre-pandemic period, the GDP average annual growth rate between 2018 to 2020 is maintained at a relatively stable state of around 2.92%. By contrast, after 2020's first quarter, the average annual growth rate of GDP reaches 12.16%, which is overall higher than the pre-pandemic period. What stands out here is that GDP has suffered a strong impact under the appearance of the pandemic. However, it continues to recover due to multiple factors, including reopening policy regarding business activities, boosted consumer spending expectations towards previously regulated policy, and government intervention made to improve public service.



Data Summary and Analysis

To evaluate further the reasons of GDP change in growth level before and after the pandemic, we compared three major sectors of business and have found the same declining trend displayed by the three sector's growth rates in the initial quarter of 2020 after the appearance of the pandemic. From the first quarter of 2020 to July 2022, three sectors have displayed a continuous average growth rate increase of 14.25%, 6.91%, and 4.94%. Among the three sectors, the GDP business sector increased the most greatly. This fact indicates that the constraint effect imposed on consumption and stable government spending to maintain public service and growth in purchasing power of the consumer and household income has not kept pace with the reopening of business productivity growth after the Covid period due to the change of structure of consumption, despite the encouraging effect of business service and companies activities.



Unemployment:

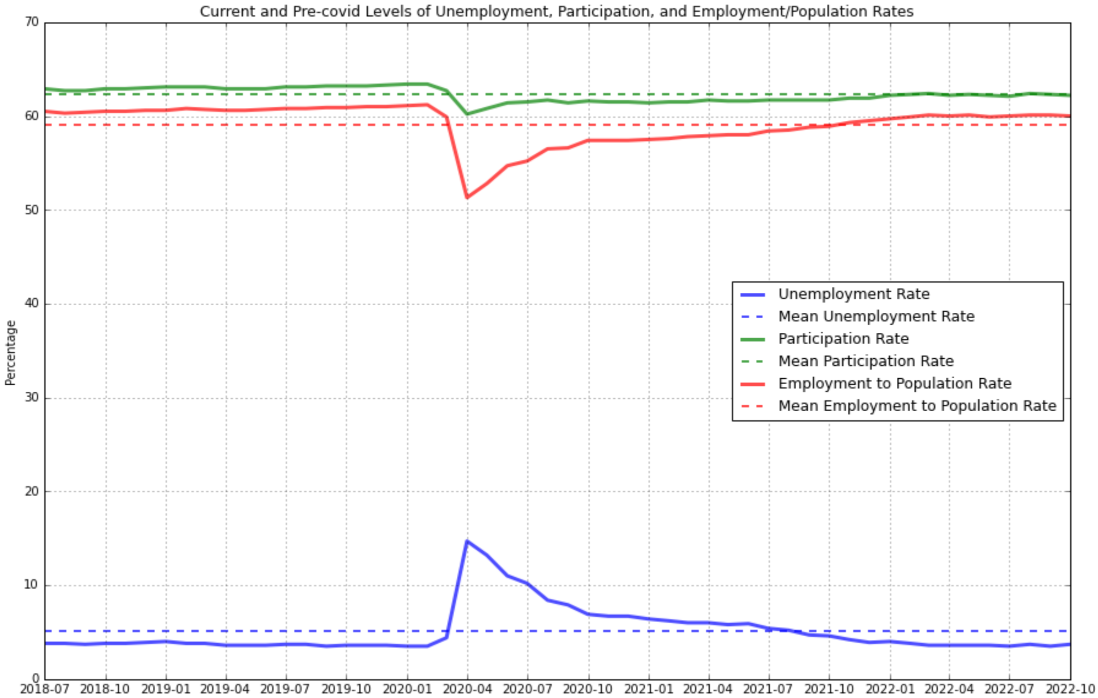
Data Collection

The unemployment rate reflects the percentage of people in the labor force who are currently unemployed but actively seeking work. It is a significant indicator of economic conditions. If workers lose their jobs, their families' disposable income reduces, weakening the purchasing power and economic output. The country then loses workers' contribution to the economy regarding goods or services they could have produced. This can have a chain effect that spreads throughout the whole economy, which even affects those who are still working. The unemployment rate, employment level, and employment to population ratio data were collected by using the fredapi with series ID (UNRATE), (CIVPART), (EMRATIO). Data were collected from July 2018 to July 2022. The object is to analyze the unemployment rate trend before and after the epidemic.

Data Summary and Analysis

According to the chart below, from July 2018 to early 2020, a slight increase in employment and a slight decrease in unemployment can be found, which can be seen as a reflection of the rising economy. However, the Covid-19 pandemic had an impact on both the unemployment and participation rates. In fact, the U.S. participation rate declined significantly in 2020, with the most significant drop from 63.4% in January 2020 to 60.2% in April 2020. Meanwhile, the unemployment rate is as high as 14.7%. Since then, the unemployment rate has gradually returned to an average of 5.1% from 2018 to 2022. However, this average rate is still lower than the average unemployment rate of 5.8% from 1949 to 2019, according to the U.S. Bureau of Labor Statistics.

Overall, by unemployment rate measurement, the U.S. economy is now in a better position than it was at the beginning of the epidemic, but not quite back to where it was before the epidemic.



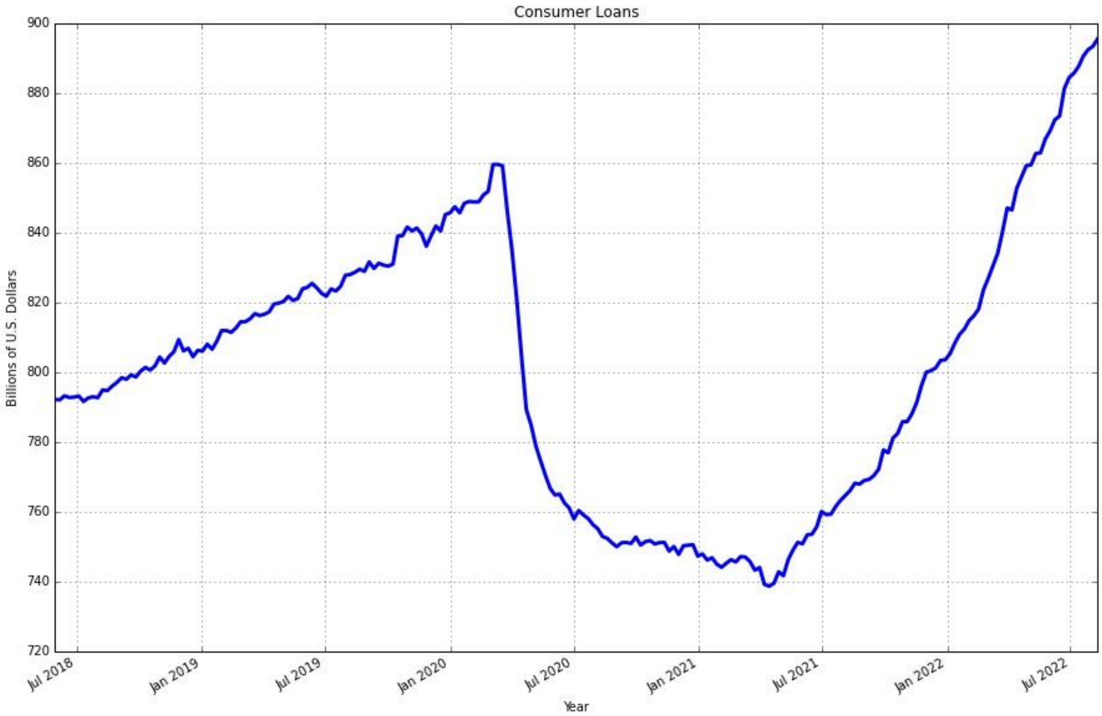
Consumer Loans:

<u>Introduction and Data Collection</u>

A consumer loan is a loan to individuals, households, or families' expenditures, such as credit card and motor vehicle loans. It suggests the consumption of individuals, households, and families and, in turn, reflects the economic condition. This section focuses on the data of consumer loans by all commercial banks from July 2018 to July 2022 imported from FRED (Series ID: CCLACBW027SBOG), analyzes the consumer loan trend before and after the Covid pandemic, and interprets possible reasons for the features of the trend.

<u>Data Summary and Analysis</u>

The line graph below virtually presents the general trend of consumer loans based on the imported data. Between July 2018 and the beginning of 2020, there has been a gradual rise in consumer loans in the U.S., which reached a peak of over 850 billion U.S. dollars. What stands out in this line graph is the dramatic decline in March 2020, at which point the consumer loan amount dropped about 100 billion dollars. After the sharp decline, the amount of consumer loans continued to decrease steadily and fell to a low point of around 740 billion dollars in May 2021. Since then, consumer loans began to rise again and reached a high point of 889 billion dollars in July 2022. The dramatic decline at the beginning of 2020 could result from uncertainty led by increased information asymmetry during the pandemic. The increase in unemployment during the epidemic and the expectation of additional medical expenses will increase the income uncertainty and expense uncertainty faced by individuals and households. As a result, consumer loan demand decreases to ensure sufficient savings to deal with future uncertainty. At the same time, the epidemic creates uncertainty for banks that provide loans. Because an increase in unemployment brings a higher risk of loan default, banks will be more likely to limit loans, decreasing the availability of loans. With both declines in demand and supply of consumer loans, the quantity of consumer loans would decrease significantly. However, consumer loans started recovering quickly after the low point. One potential reason is the influence of monetary policy by the Fed which maintained the Federal Fund Rate low since March 2020 and claimed to keep it low in September 2020.



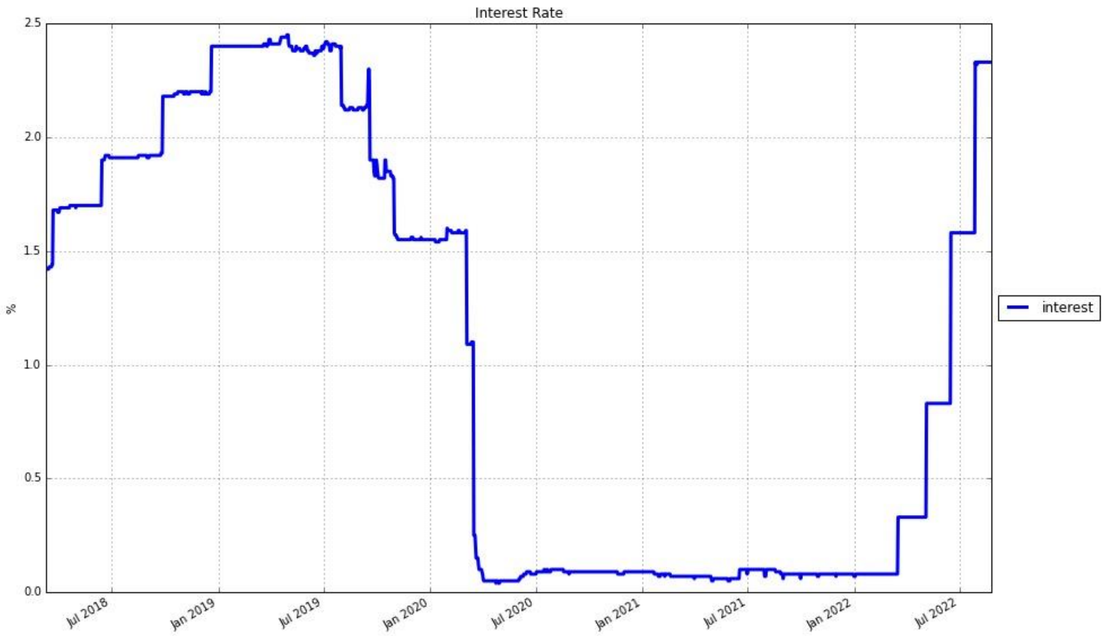
Federal Funds Rate:

<u>Data Collection</u>

The federal funds rate is the interest rate at which depository institutions lend reserve balances to other depository institutions overnight on an uncollateralized basis. It means the interest rate of the U.S. dollars on the newspaper. We choose the Federal Funds rate as our forth part of the data because it is closely related to the monetary policy of the federal reserve system. We imported data from Fred and visualize it to see the trend for interest rates and how this corresponds to the pandemic. Data are from Fred (Series ID: DFF) from July 2019 to July 2022, reflecting changes in federal funds rates before and after the epidemic.

Data Summary and Analysis

The interest rate before 2020 is circling at 2 %. When Covid-19 arose in March 2020, the interest rate dropped to nearly 0%. From the beginning of 2022, the federal reserve system started to increase interest rates. They did not adjust the interest rate around some point like that before the pandemic. They raised the interest rate by a large percentage after a while, trying to lower the inflation rate and CPI number.



Conclusion

After comparing four economic data series, when covid-19 spread globally in a short time, people's confidence had taken a hit, and GDP and consumer loans experienced a gigantic decrease. Simultaneously, the unemployment rate had reached its climax. However, the federal reserve took action immediately to let the interest rate decrease to nearly zero percent (<0.5%). After a continuous two-year low-interest rate, economic confidence gradually increased with a higher consumer loan. Also, compared with the pre-pandemic period, the overall average GDP growth rate is high, the unemployment rate is lower than average, and there is a quick recovery in consumer loans.

Even after experiencing four times skyrocketing interest rates, the unemployment rate is still steady, and the other economic index is growing at a constant speed. Therefore, the appearance of the pandemic is a threat to economic stability; with the measure of money policies like the control of nearly 0% interest rate by the federal reserve system, the unemployment rate came below the average, and other economic indexes grew gradually.

Reference

(*Gross Domestic Product (GDP) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/GDP

(*Consumer Loans: Credit Cards and Other Revolving Plans, All Commercial Banks*, n.d.)
https://fred.stlouisfed.org/series/CCLACBW027SBOG

(*Federal Funds Effective Rate (DFF) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/DFF

(*Gross Value Added: GDP: Business (A195RC1Q027SBEA) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/A195RC1Q027SBEA

(*Gross Value Added: GDP: Households and Institutions (A193RC1Q027SBEA) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/A193RC1Q027SBEA

(*Gross value added: GDP: General government (A765RC1Q027SBEA)| FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/A765RC1Q027SBEA

(*Unemployment Rate (UNRATE) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/UNRATE

(*Labor Force Participation Rate (CIVPART) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/CIVPART

(*Employment-Population Ratio (EMRATIO) | FRED | St. Louis Fed*, n.d.)
https://fred.stlouisfed.org/series/EMRATIO

(Labor Force Statistics from the Current Population Survey)
https://www.bls.gov/cps/aa2019/cpsaat01.htm