Recession Analysis

A recession is an economic situation that arrives when the circulation of money in the economy is low for two consecutive quarters.

Recession is calculated and analyzed according to the growth in GDP, the growth in the unemployment rate, and the growth in consumer spending rate. But the most common way of measuring recession is by analyzing the monthly GDP growth data.

So, for the task of Recession analysis, we are going to use a dataset of the monthly Greece's GDP from 2016 to 2019.

Recession Analysis using Python

Now let's start this task of Recession analysis by importing the necessary Python libraries and the dataset:

In [1]:
```
import pandas as pd
import plotly.express as px
import plotly.graph_objects as go
import plotly.io as pio
```

In [2]:
```
df = pd.read_excel('gdp_gr.xlsx')
```

In [14]:
```
df.head(15)
```

Out[14]:

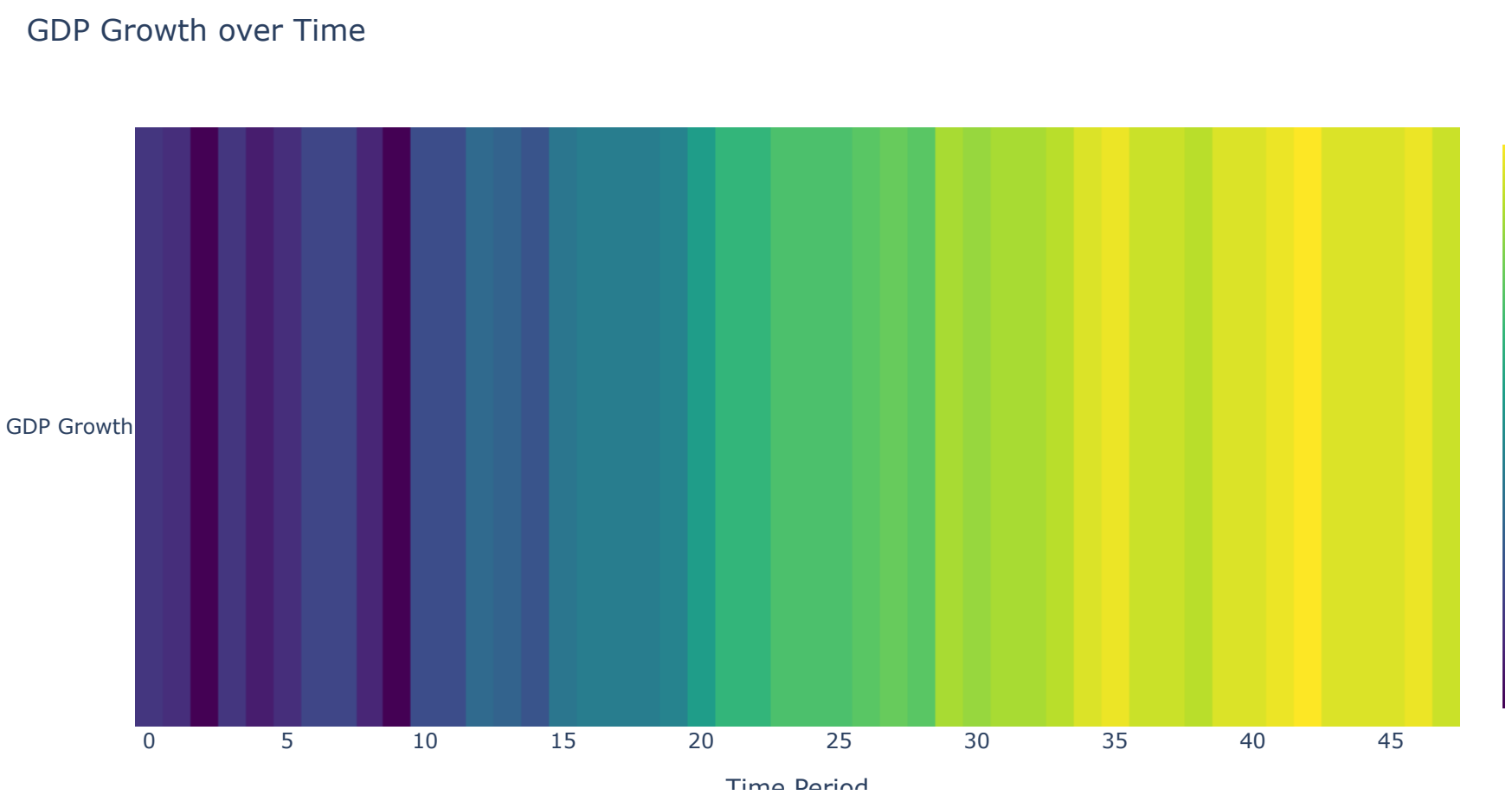
Date	GDP Growth
2016-01-01	-0.8
2016-02-01	-0.9
2016-03-01	-1.4
2016-04-01	-0.8
2016-05-01	-1.1
2016-06-01	-0.9
2016-07-01	-0.6
2016-08-01	-0.6
2016-09-01	-1.0
2016-10-01	-1.4
2016-11-01	-0.5
2016-12-01	-0.5
2017-01-01	-0.1
2017-02-01	-0.2
2017-03-01	-0.4

Let’s have a look at the GDP growth over time:

In [4]:
```
fig = go.Figure(data=go.Heatmap(
                    z=[df['GDP Growth']],
                    x=df.index,
                    y=['GDP Growth'],
                    colorscale='Viridis'))

fig.update_layout(title='GDP Growth over Time',
                  xaxis_title='Time Period',
                  yaxis_title='')

fig.show()
```



As a recession means the decline in the circulation of money for two consecutive quarters, I will convert our monthly data into quarterly data to analyze the recession:

In [5]:
```
# Convert monthly data to quarterly data using resample method

df['Date'] = pd.to_datetime(df['Date'], format='/%m/%Y')
df.set_index('Date', inplace=True)
quarterly_data = df.resample('Q').mean()
print(quarterly_data)
```

```
            GDP Growth
Date
2016-03-31   -1.033333
2016-06-30   -0.933333
2016-09-30   -0.733333
2016-12-31   -0.800000
2017-03-31   -0.233333
2017-06-30    0.166667
2017-09-30    0.400000
2017-12-31    1.166667
2018-03-31    1.333333
2018-06-30    1.600000
2018-09-30    1.866667
2018-12-31    2.166667
2019-03-31    2.066667
2019-06-30    2.233333
2019-09-30    2.266667
2019-12-31    2.200000
```

Now we can calculate and analyze recession based on quarterly GDP growth:

In [6]:
```
# Calculate recession based on quarterly GDP growth

quarterly_data['Recession'] = ((quarterly_data['GDP Growth'] < 0) & (quarterly_data['GDP Growth'].shift(1) < 0))
```

In [7]:
```
# Fill missing values with False (since the first quarter cannot be in a recession)

quarterly_data['Recession'].fillna(False, inplace=True)
```

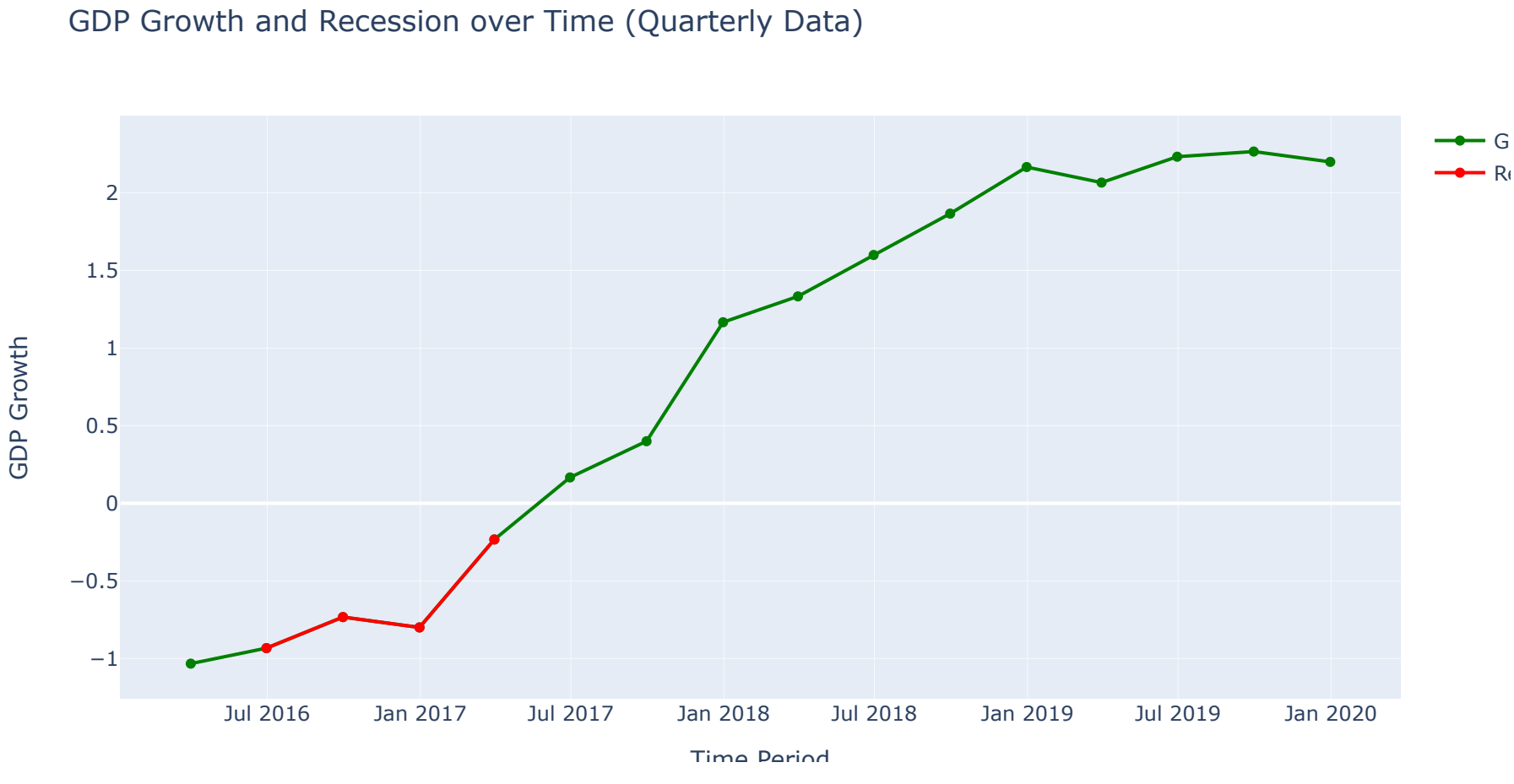
In [8]:
```
# Plot the GDP growth and recession data

fig = go.Figure()
fig.add_trace(go.Scatter(x=quarterly_data.index,
                         y=quarterly_data['GDP Growth'],
                         name='GDP Growth',
                         line=dict(color='green', width=2)))

fig.add_trace(go.Scatter(x=quarterly_data[quarterly_data['Recession']].index,
                         y=quarterly_data[quarterly_data['Recession']]['GDP Growth'],
                         name='Recession', line=dict(color='red', width=2)))

fig.update_layout(title='GDP Growth and Recession over Time (Quarterly Data)',
                  xaxis_title='Time Period',
                  yaxis_title='GDP Growth')

fig.show()
```



The red line shows the periods of negative GDP growth (considered recessions), and the green line shows the overall trend in GDP growth over time.

The severity of a recession refers to the extent to which the economy contracts during a recession. A severe recession involves a deeper and more prolonged decline in economic activity, resulting in negative effects on employment, incomes and other economic indicators

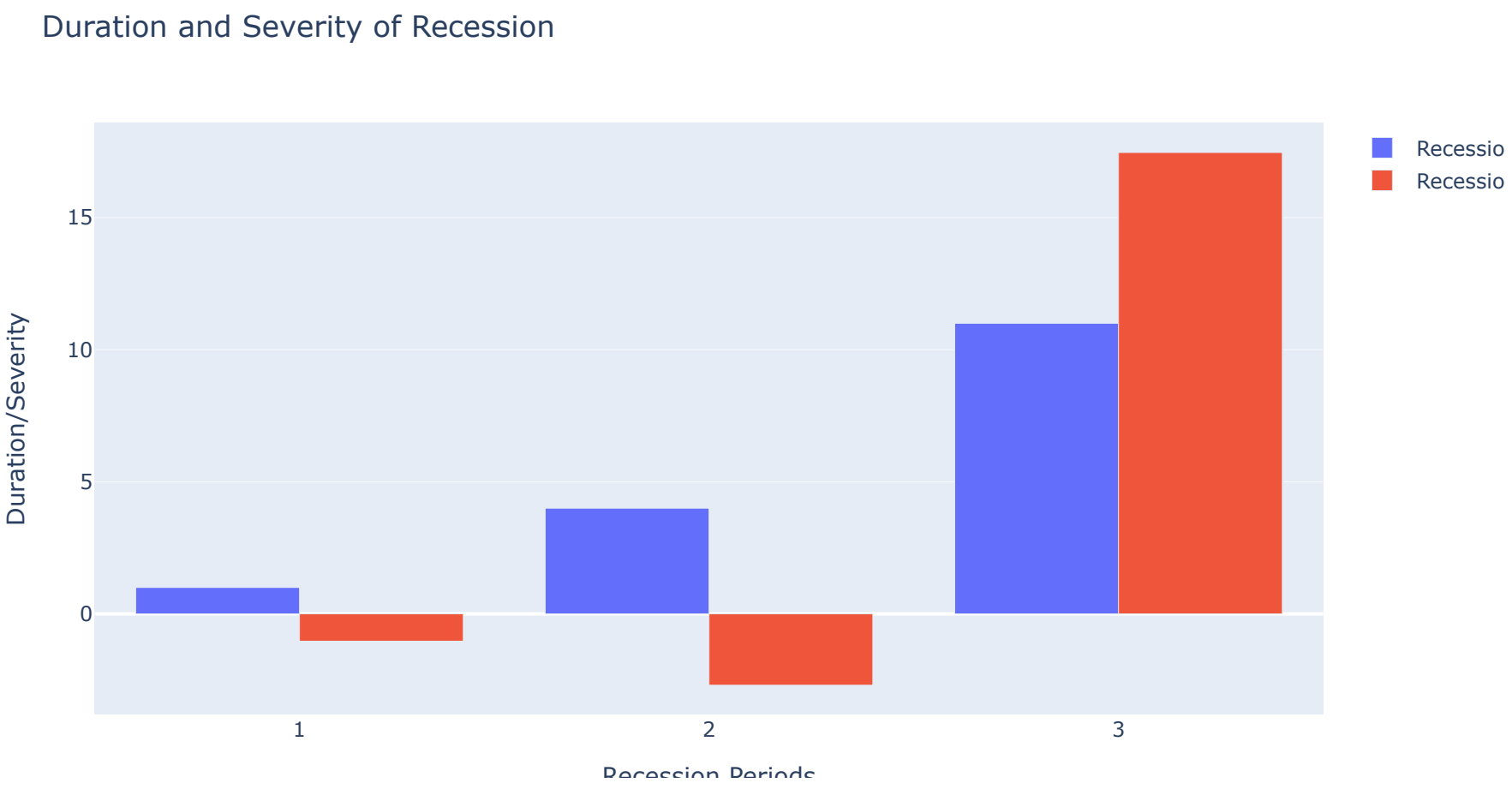
In [11]:
```
quarterly_data['Recession Start'] = quarterly_data['Recession'].ne(quarterly_data['Recession'].shift()).cumsum()
recession_periods = quarterly_data.groupby('Recession Start')
recession_duration = recession_periods.size()
recession_severity = recession_periods['GDP Growth'].sum()

fig = go.Figure()

fig.add_trace(go.Bar(x=recession_duration.index, y=recession_duration,
                     name='Recession Duration'))
fig.add_trace(go.Bar(x=recession_severity.index, y=recession_severity,
                     name='Recession Severity'))

fig.update_layout(title='Duration and Severity of Recession',
                  xaxis_title='Recession Periods',
                  yaxis_title='Duration/Severity')

fig.show()
```



Summary

A recession is an economic situation that arrives when the circulation of money in the economy is low for two consecutive quarters. Recession is calculated and analyzed according to the growth in GDP, the growth in the unemployment rate, and the growth in consumer spending rate.