```
In [1]:  import pandas as pd
         import plotly.graph_objs as go
         import plotly.express as px
         import plotly.io as pio
         pio.templates.default = "plotly_white"

         data = pd.read_csv('UK_monthly_gdp.csv')
         print(data.head())
```

Matplotlib is building the font cache; this may take a moment.

```
  Time Period  GDP Growth
0    /01/2020         0.3
1    /02/2020        -0.5
2    /03/2020        -7.0
3    /04/2020       -20.9
4    /05/2020         3.2
```

```
In [2]:  fig = go.Figure(data=go.Heatmap(
                         z=[data['GDP Growth']],
                         x=data.index,
                         y=['GDP Growth'],
                         colorscale='Viridis'))

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

         fig.show()
```
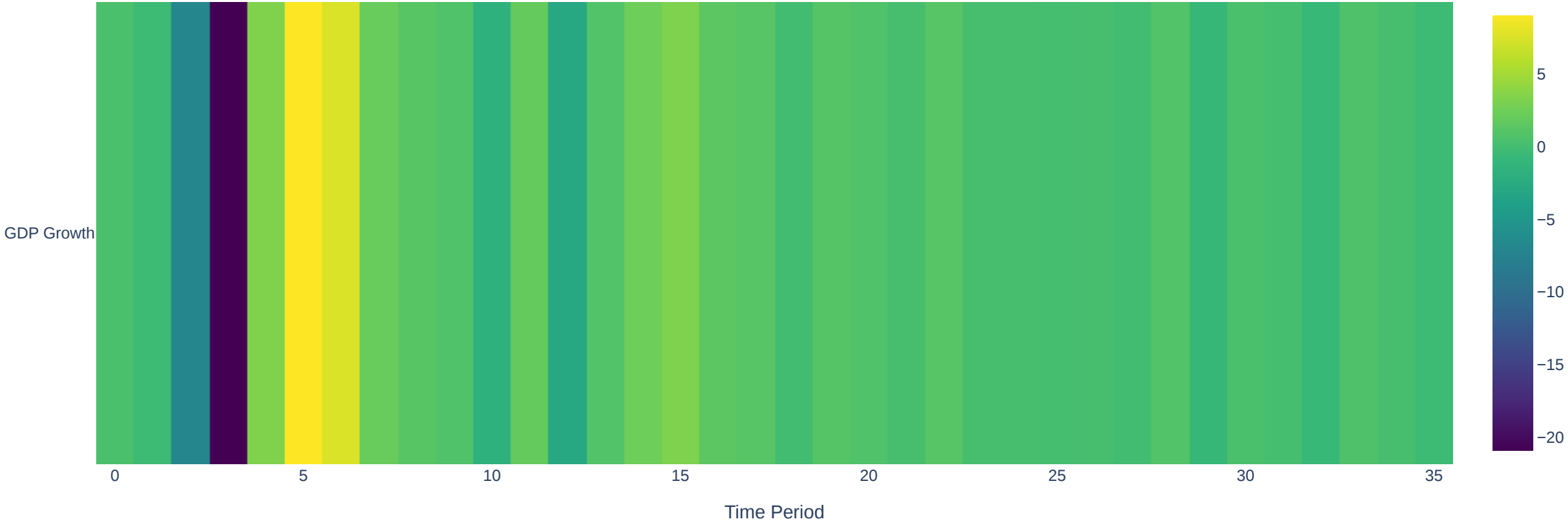

GDP Growth over Time

```
In [3]:  data['Time Period'] = pd.to_datetime(data['Time Period'], format='/%m/%Y')
         data.set_index('Time Period', inplace=True)
         quarterly_data = data.resample('Q').mean()
         print(quarterly_data.head())
```

```
             GDP Growth
Time Period
2020-03-31    -2.400000
2020-06-30    -2.900000
2020-09-30     3.500000
2020-12-31     0.200000
2021-03-31     0.033333
```

```
In [4]:  quarterly_data['Recession'] = ((quarterly_data['GDP Growth'] < 0) & (quarterly_data['GDP Growth'].shift(1) < 0))

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

         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()
```
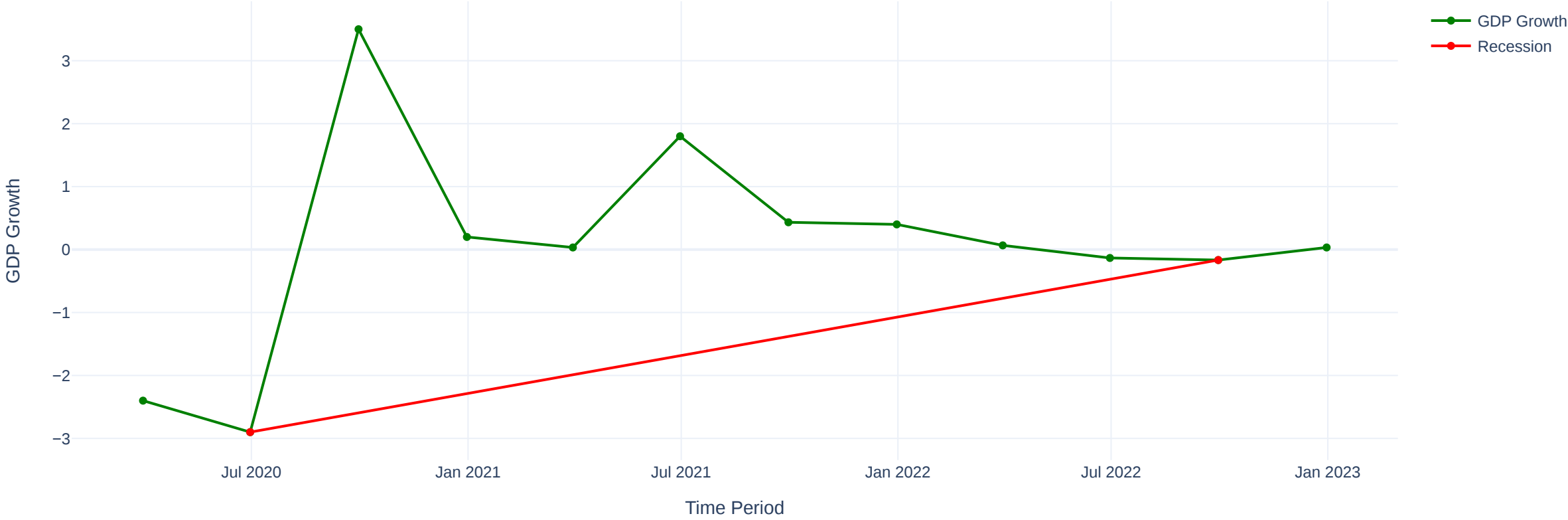

GDP Growth and Recession over Time (Quarterly Data)

```
In [5]:  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()
```
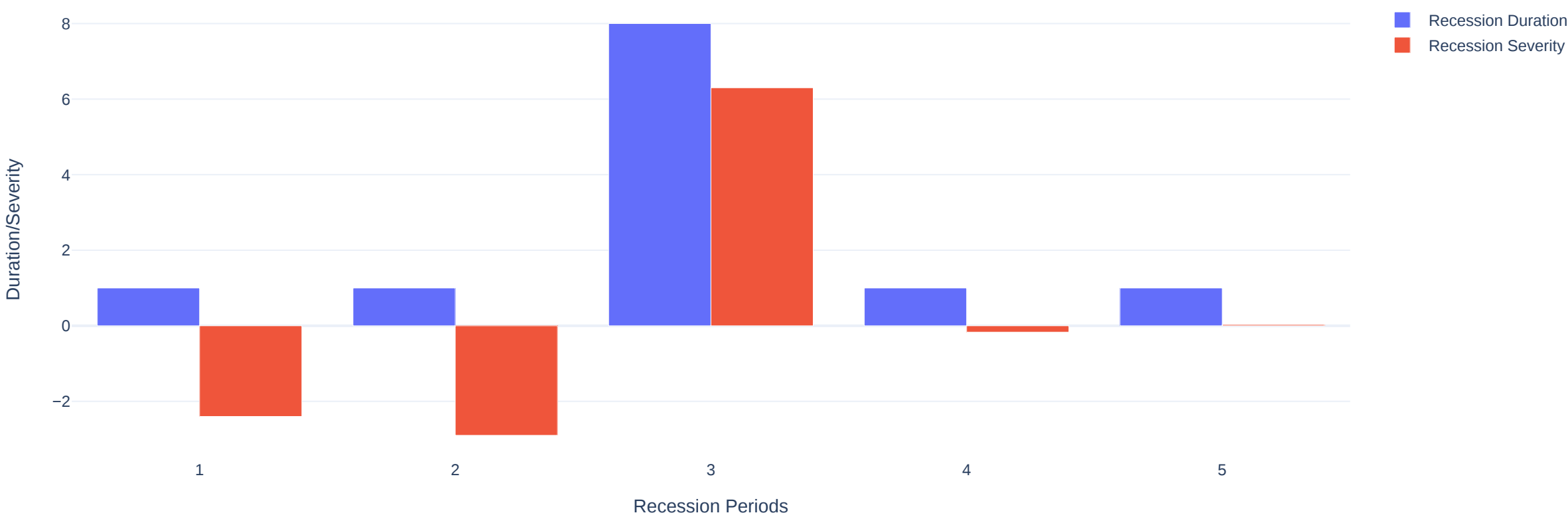

Duration and Severity of Recession

```
In [ ]:
```