# Matplotlib

> Document: https://matplotlib.org

# Setup

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
```

```
df = pd.read_csv('/content/Economy_of_US.csv')
df
```

| | Year | GDP_PPP | GDP_PerCapita_PPP | GDP_Nominal | GDP_PerCapita_Nominal | GDP_( |
|---|---|---|---|---|---|---|
| 0 | 1980 | 2857.3 | 12552.9 | 2857.3 | 12552.9 | |
| 1 | 1981 | 3207.0 | 13948.7 | 3207.0 | 13948.7 | |
| 2 | 1982 | 3343.8 | 14405.0 | 3343.8 | 14405.0 | |
| 3 | 1983 | 3634.0 | 15513.7 | 3634.0 | 15513.7 | |
| 4 | 1984 | 4037.7 | 17086.4 | 4037.7 | 17086.4 | |
| 5 | 1985 | 4339.0 | 18199.3 | 4339.0 | 18199.3 | |
| 6 | 1986 | 4579.6 | 19034.8 | 4579.6 | 19034.8 | |
| 7 | 1987 | 4855.3 | 20001.0 | 4855.3 | 20001.0 | |
| 8 | 1988 | 5236.4 | 21376.0 | 5236.4 | 21376.0 | |
| 9 | 1989 | 5641.6 | 22814.1 | 5641.6 | 22814.1 | |
| 10 | 1990 | 5963.1 | 23848.0 | 5963.1 | 23848.0 | |
| 11 | 1991 | 6158.1 | 24302.8 | 6158.1 | 24302.8 | |
| 12 | 1992 | 6520.3 | 25392.9 | 6520.3 | 25392.9 | |
| 13 | 1993 | 6858.6 | 26364.2 | 6858.6 | 26364.2 | |
| 14 | 1994 | 7287.3 | 27674.0 | 7287.3 | 27674.0 | |
| 15 | 1995 | 7639.8 | 28671.5 | 7639.8 | 28671.5 | |
| 16 | 1996 | 8073.1 | 29947.0 | 8073.1 | 29947.0 | |

| | | | | | |
|---|---|---|---|---|---|
| 17 | 1997 | 8577.6 | 31440.1 | 8577.6 | 31440.1 |
| 18 | 1998 | 9062.8 | 32833.7 | 9062.8 | 32833.7 |
| 19 | 1999 | 9631.2 | 34496.2 | 9631.2 | 34496.2 |
| 20 | 2000 | 10251.0 | 36312.8 | 10251.0 | 36312.8 |
| 21 | 2001 | 10581.9 | 37101.5 | 10581.9 | 37101.5 |
| 22 | 2002 | 10929.1 | 37945.8 | 10929.1 | 37945.8 |
| 23 | 2003 | 11456.5 | 39405.4 | 11456.5 | 39405.4 |
| 24 | 2004 | 12217.2 | 41641.6 | 12217.2 | 41641.6 |
| 25 | 2005 | 13039.2 | 44034.3 | 13039.2 | 44034.3 |
| 26 | 2006 | 13815.6 | 46216.9 | 13815.6 | 46216.9 |
| 27 | 2007 | 14474.3 | 47943.4 | 14474.3 | 47943.4 |
| 28 | 2008 | 14769.9 | 48470.6 | 14769.9 | 48470.6 |
| 29 | 2009 | 14478.1 | 47102.4 | 14478.1 | 47102.4 |
| 30 | 2010 | 15049.0 | 48586.3 | 15049.0 | 48586.3 |
| 31 | 2011 | 15599.7 | 50008.1 | 15599.7 | 50008.1 |
| 32 | 2012 | 16254.0 | 51736.7 | 16254.0 | 51736.7 |
| 33 | 2013 | 16843.2 | 53245.5 | 16843.2 | 53245.5 |
| 34 | 2014 | 17550.7 | 55083.5 | 17550.7 | 55083.5 |
| 35 | 2015 | 18206.0 | 56729.7 | 18206.0 | 56729.7 |
| 36 | 2016 | 18695.1 | 57840.0 | 18695.1 | 57840.0 |
| 37 | 2017 | 19479.6 | 59885.7 | 19479.6 | 59885.7 |
| 38 | 2018 | 20527.2 | 62769.7 | 20527.2 | 62769.7 |
| 39 | 2019 | 21372.6 | 65051.9 | 21372.6 | 65051.9 |
| 40 | 2020 | 20893.8 | 63078.5 | 20893.8 | 63078.5 |
| 41 | 2021 | 22996.1 | 69227.1 | 22996.1 | 69227.1 |
| 42 | 2022 | 25035.2 | 75179.6 | 25035.2 | 75179.6 |
| 43 | 2023 | 26185.2 | 78421.9 | 26185.2 | 78421.9 |
| 44 | 2024 | 27057.2 | 80779.3 | 27057.2 | 80779.3 |
| 45 | 2025 | 28045.3 | 83463.2 | 28045.3 | 83463.2 |

| | | | | | |
|---|---|---|---|---|---|
| **46** | 2026 | 29165.5 | 86521.2 | 29165.5 | 86521.2 |
| **47** | 2027 | 30281.5 | 89546.4 | 30281.5 | 89546.4 |

## ▾ A simple splot

```
plt.plot(df['Year'], df['GDP_Growth'])
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
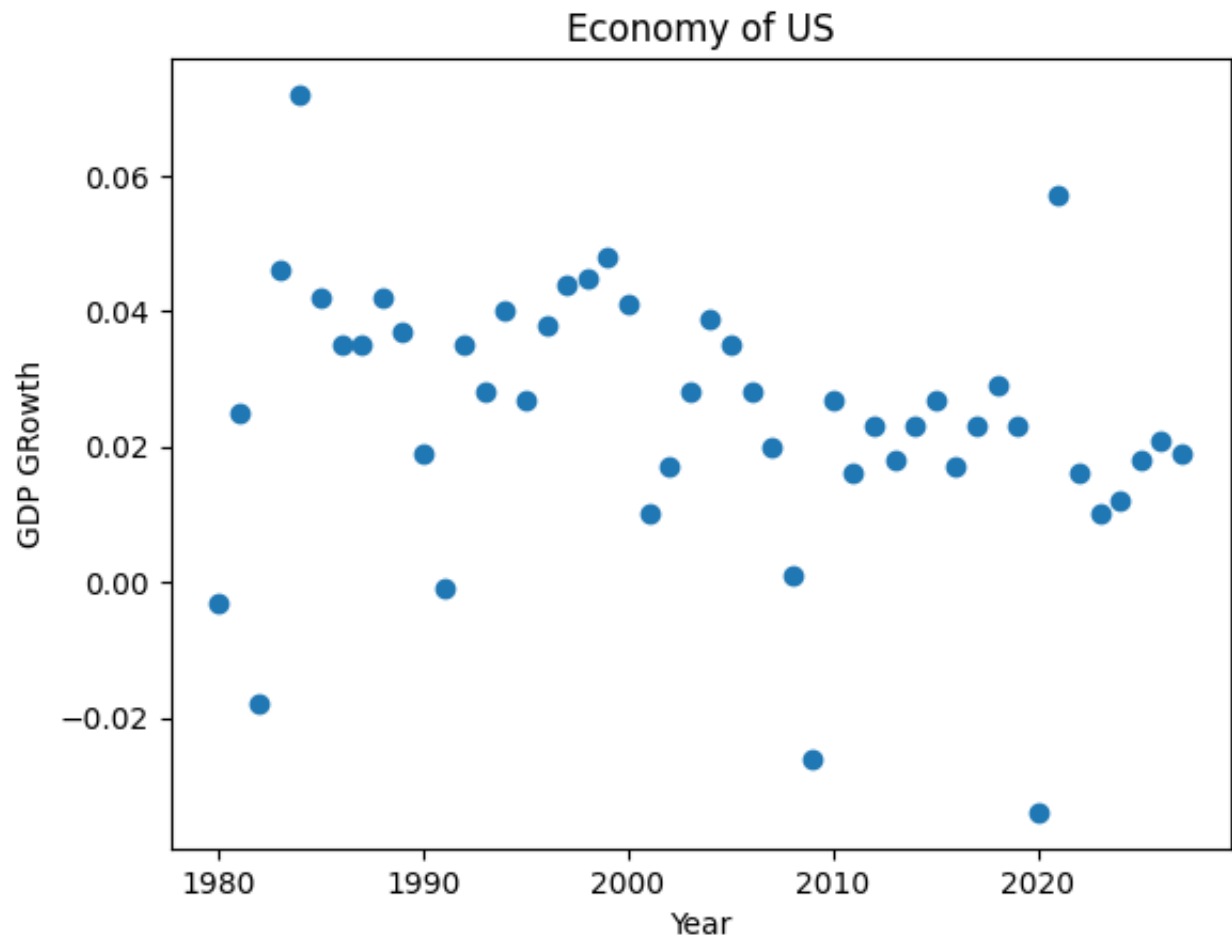
```
Text(0.5, 1.0, 'Economy of US')
```
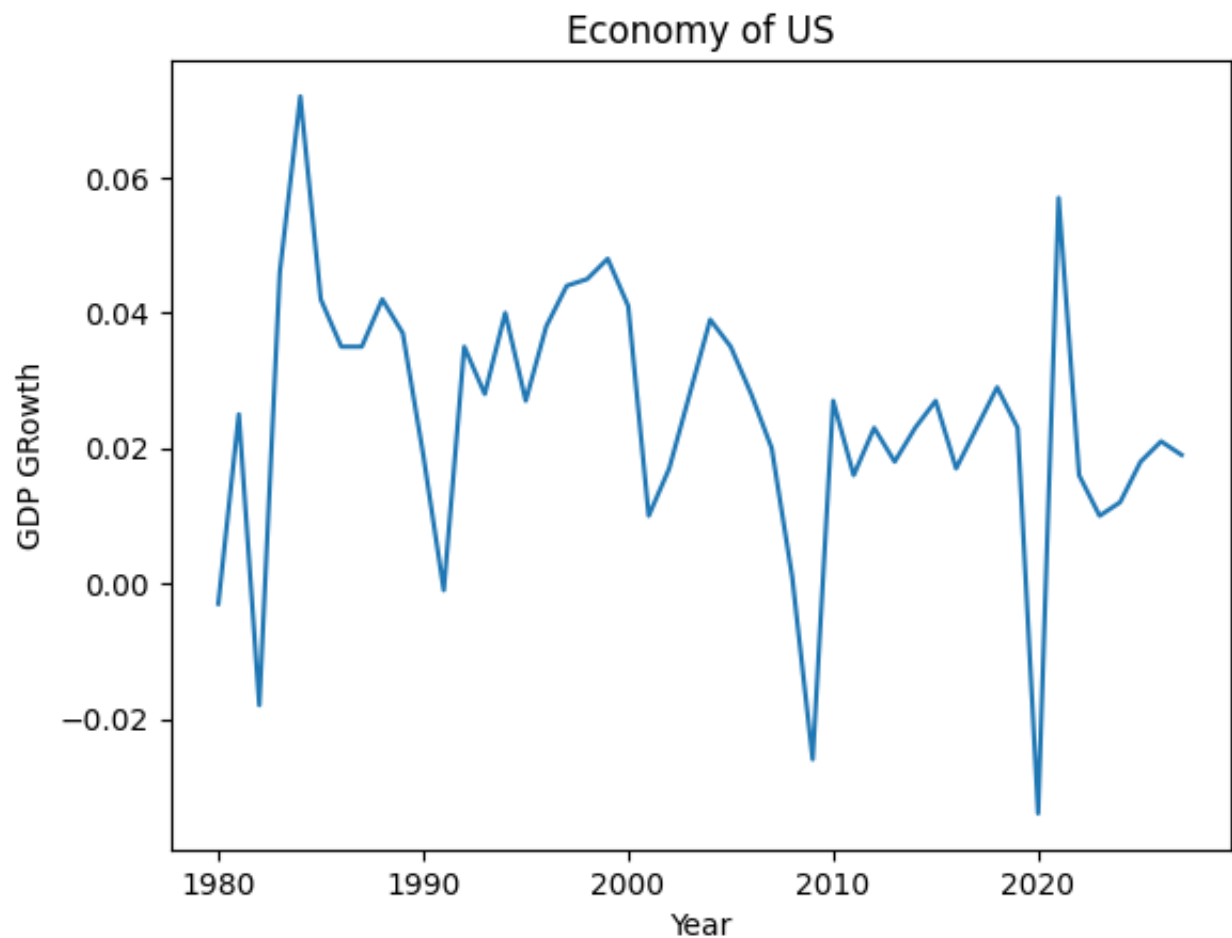


## ▾ Change markers

```
plt.plot(df['Year'], df['GDP_Growth'], 'o')
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
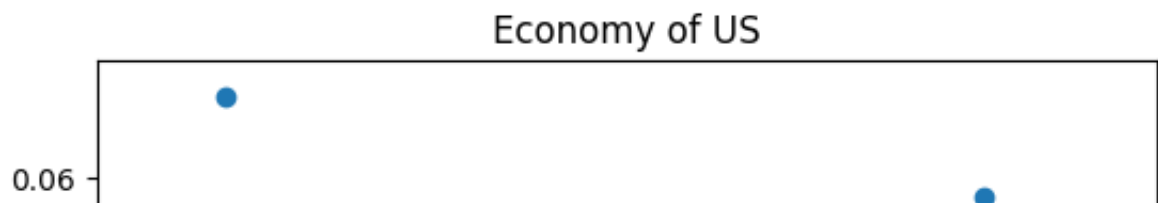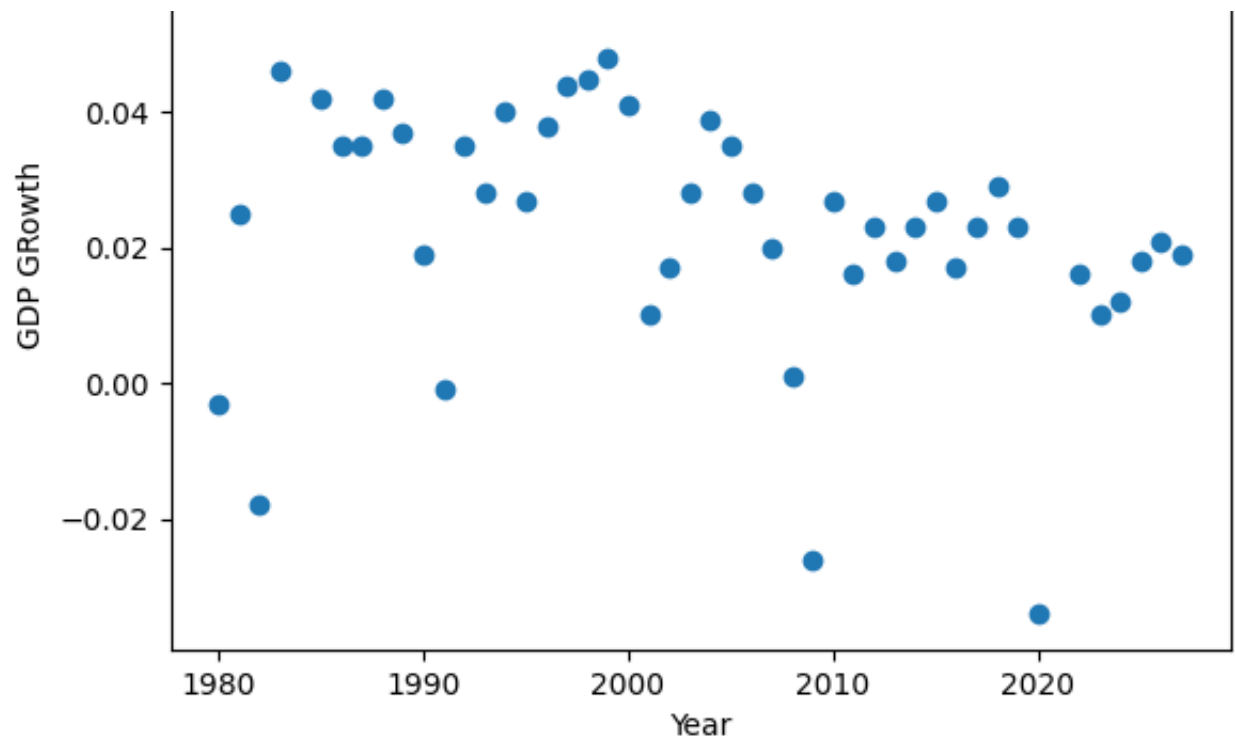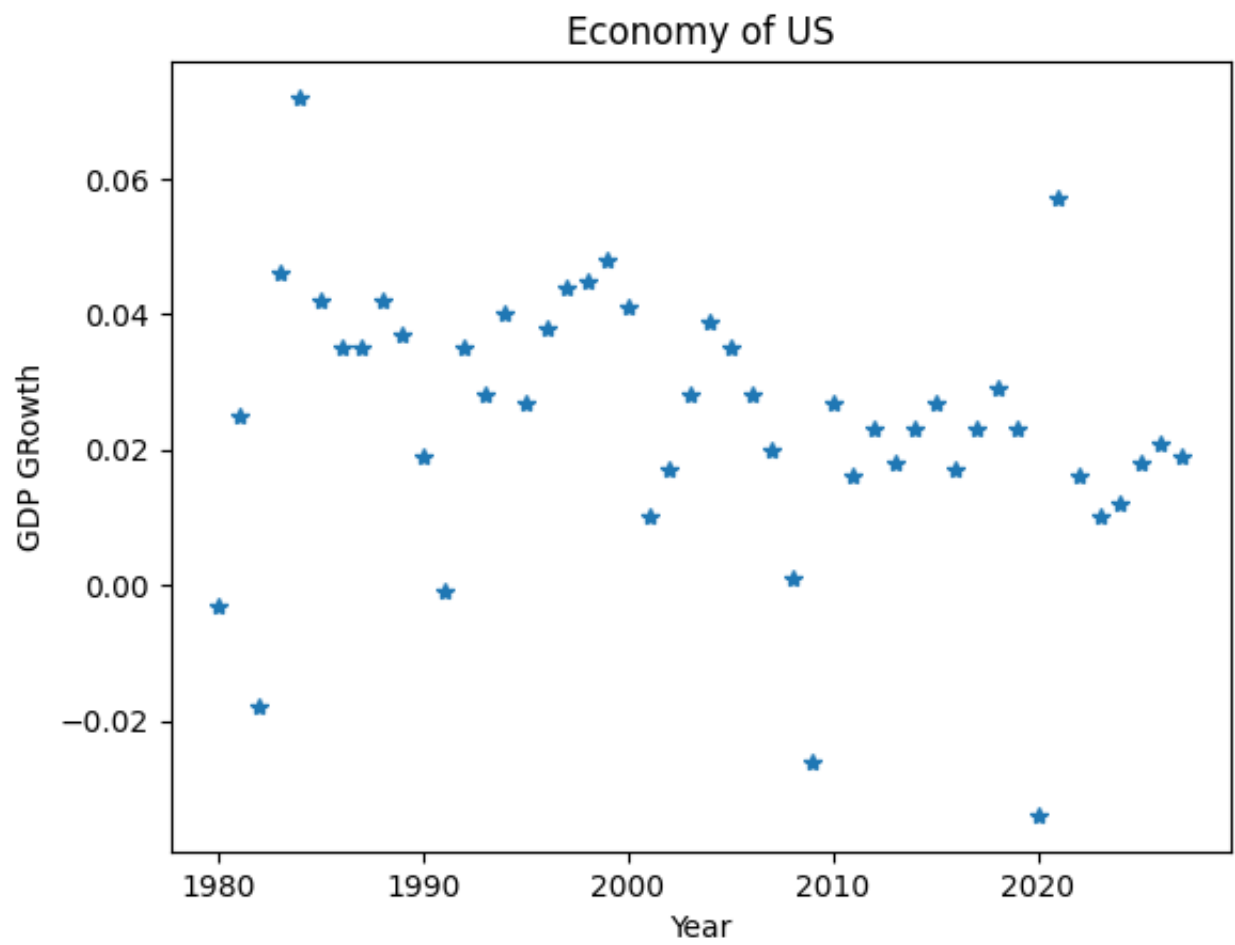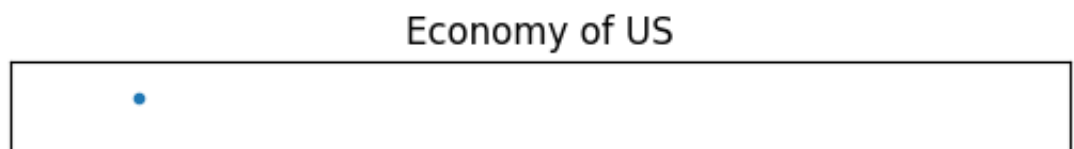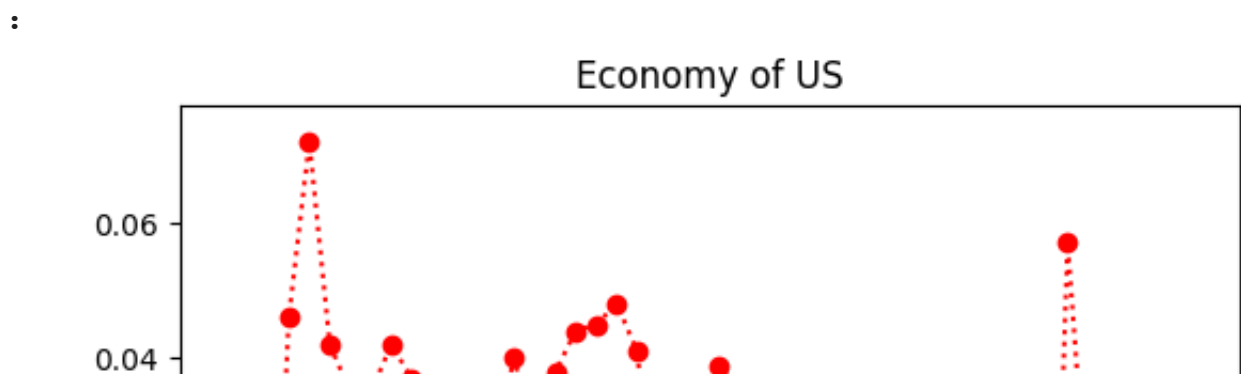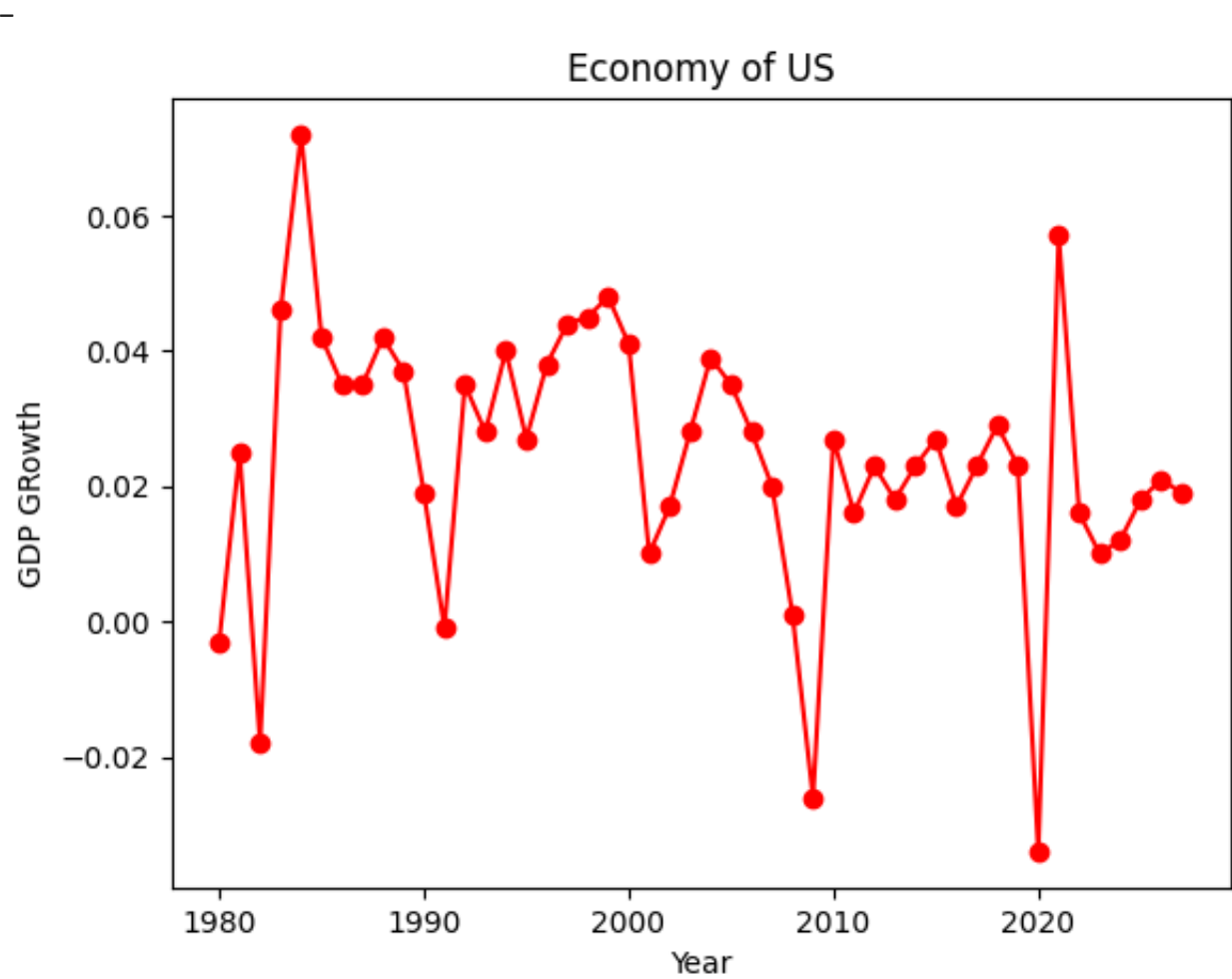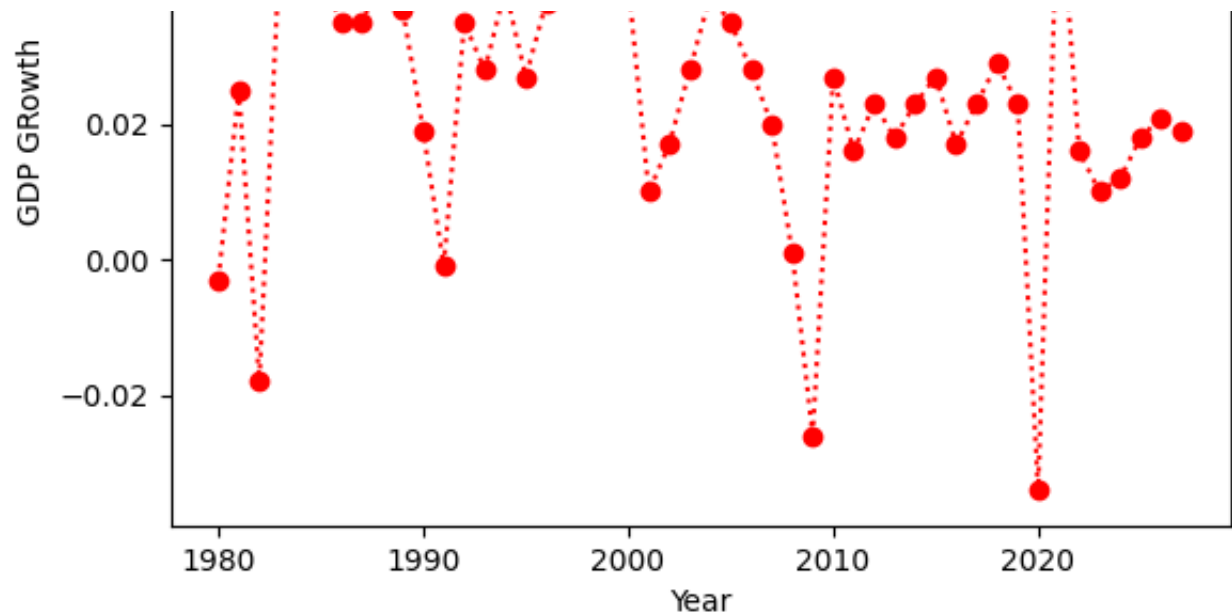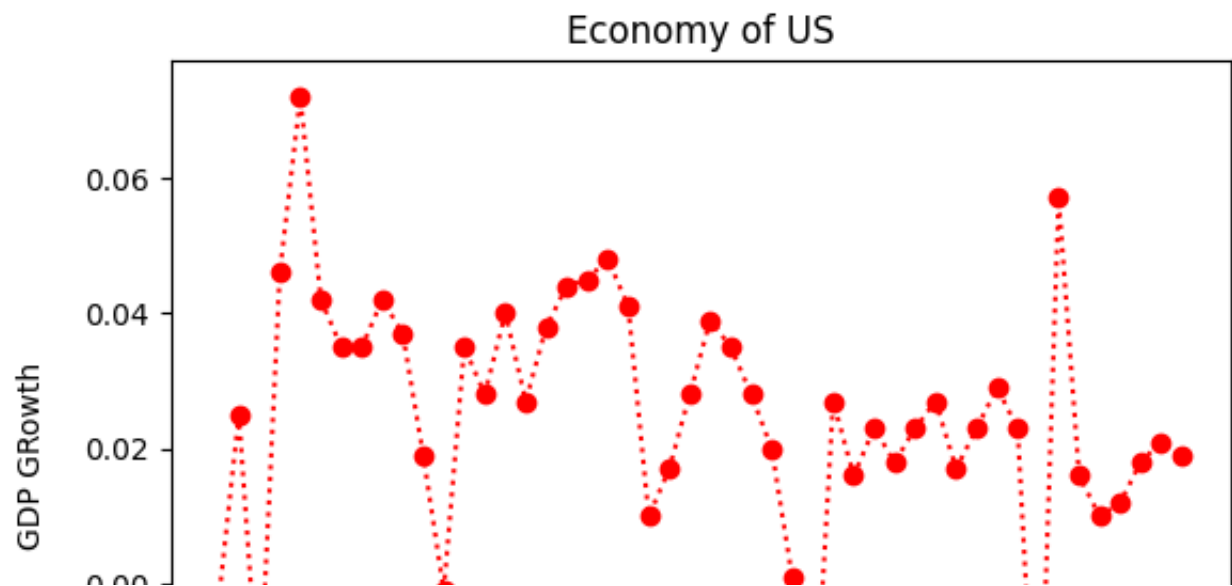
Text(0.5, 1.0, 'Economy of US')



```
markers = ['o', '*', '.', ',', 'x', 'X', '+', 'P', 's', 'D', 'd', 'p', 'H', 'h', '

for m in markers:
  print(m)
  plt.plot(df['Year'], df['GDP_Growth'], m)
  plt.xlabel('Year')
  plt.ylabel('GDP GRowth')
  plt.title('Economy of US')
  plt.show()
```

o

*

## Economy of US



.

## Economy of US

## Change line style

```
line = ['-',':','--','-.']
for l in line:
  print(l)
  l = 'o' + l + 'r'
  plt.plot(df['Year'], df['GDP_Growth'], l)
  plt.xlabel('Year')
  plt.ylabel('GDP GRowth')
  plt.title('Economy of US')
  plt.show()
```

-



:

GDP GRowth

Year

--

Economy of US

## ▾ Change color

```
color = ['r','g','b','c','m','y','k','w']
for c in color:
  print(c)
  c = 'o:' + c
  plt.plot(df['Year'], df['GDP_Growth'], c)
  plt.xlabel('Year')
  plt.ylabel('GDP GRowth')
  plt.title('Economy of US')
  plt.show()
```
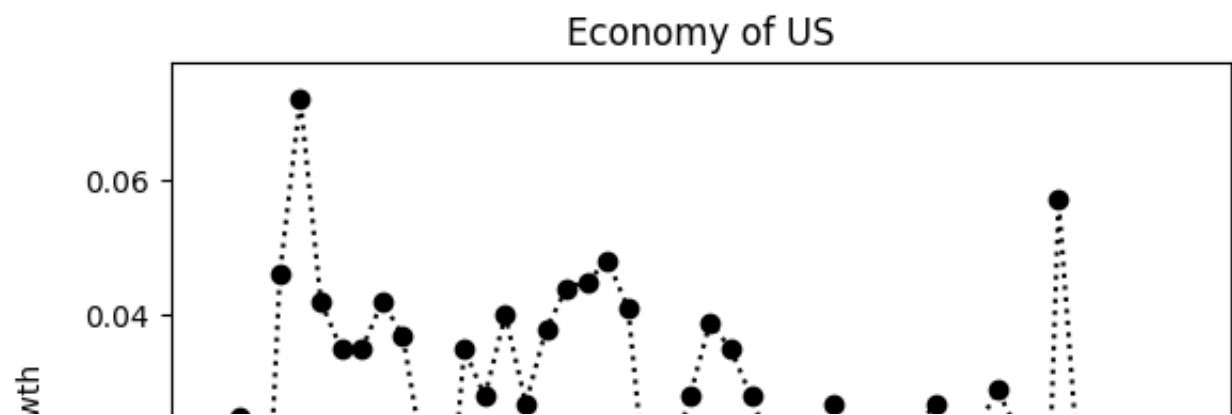
r

Economy of US



GDP GRowth

g

## Economy of US



b
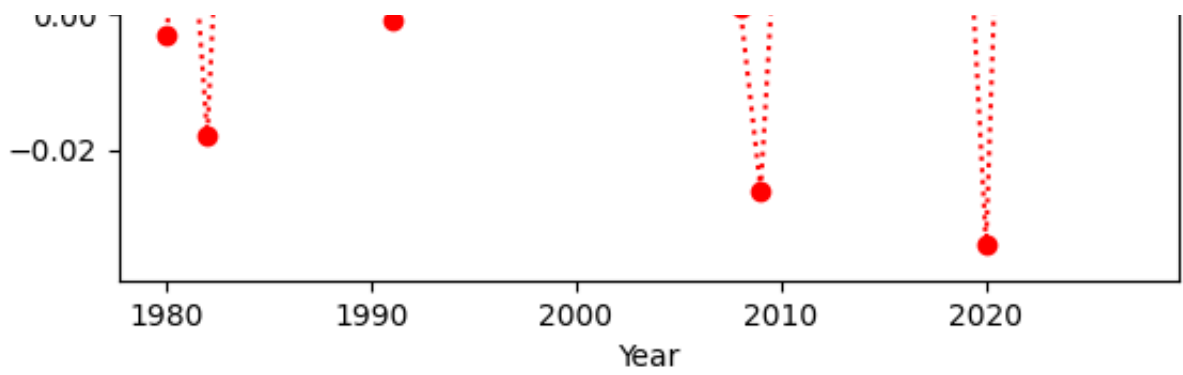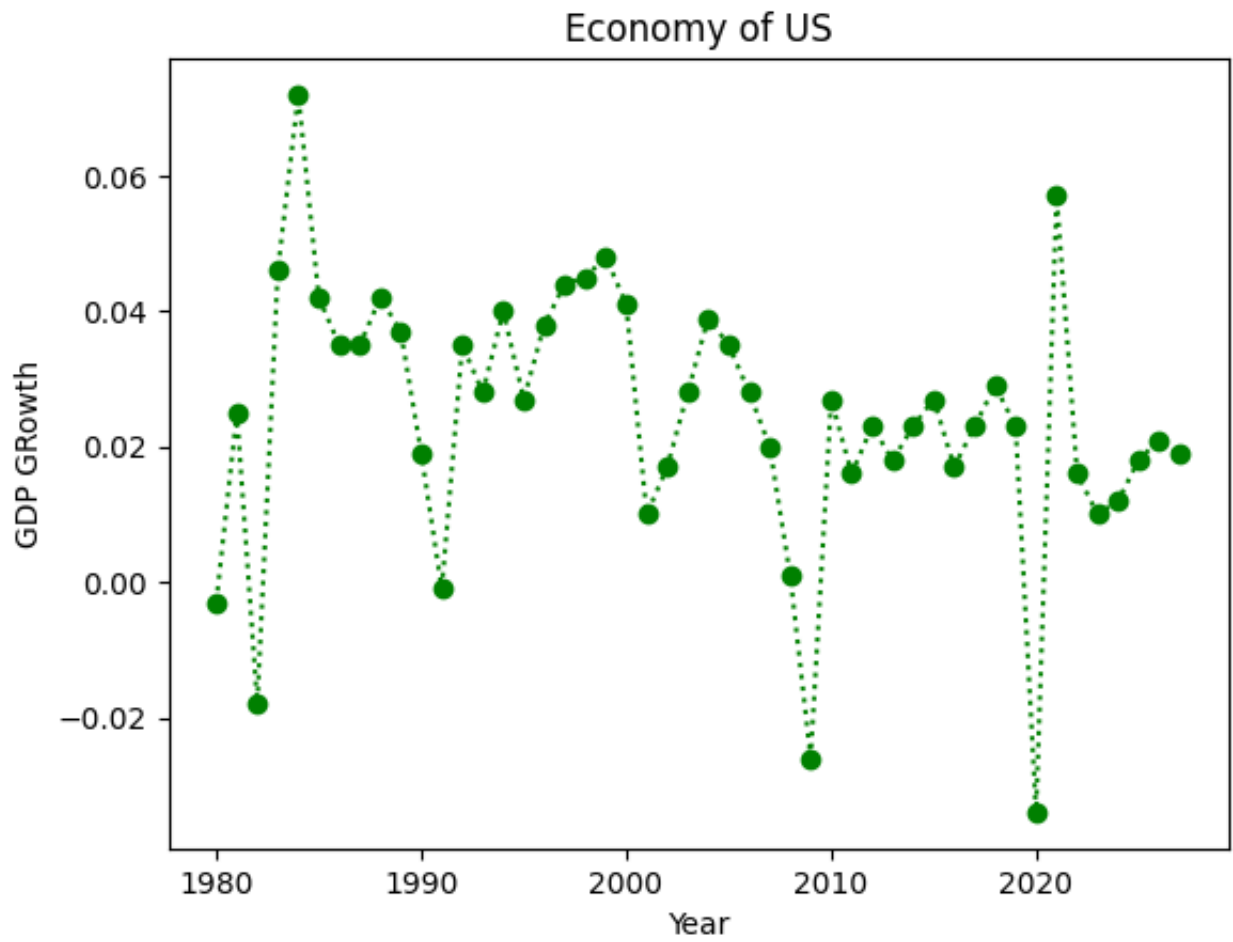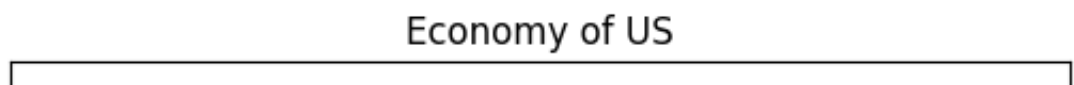
## Economy of US

▾ Change marker size
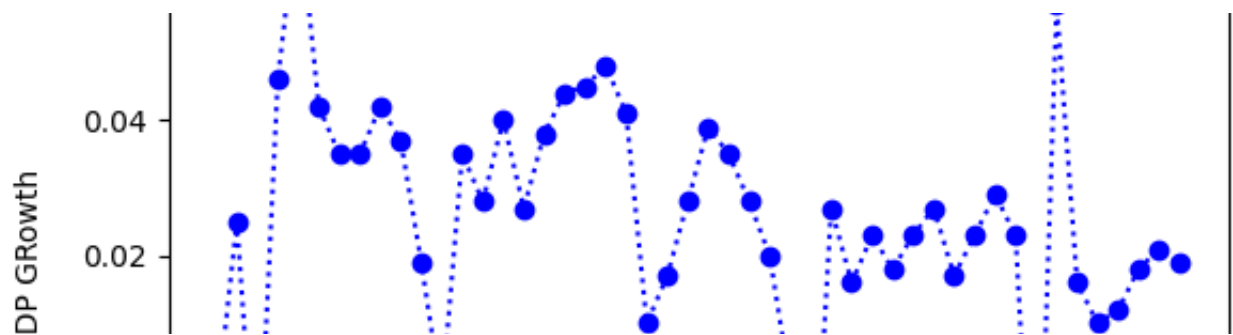
```
plt.plot(df['Year'], df['GDP_Growth'], marker = '^', ms = 15)
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```

Text(0.5, 1.0, 'Economy of US')
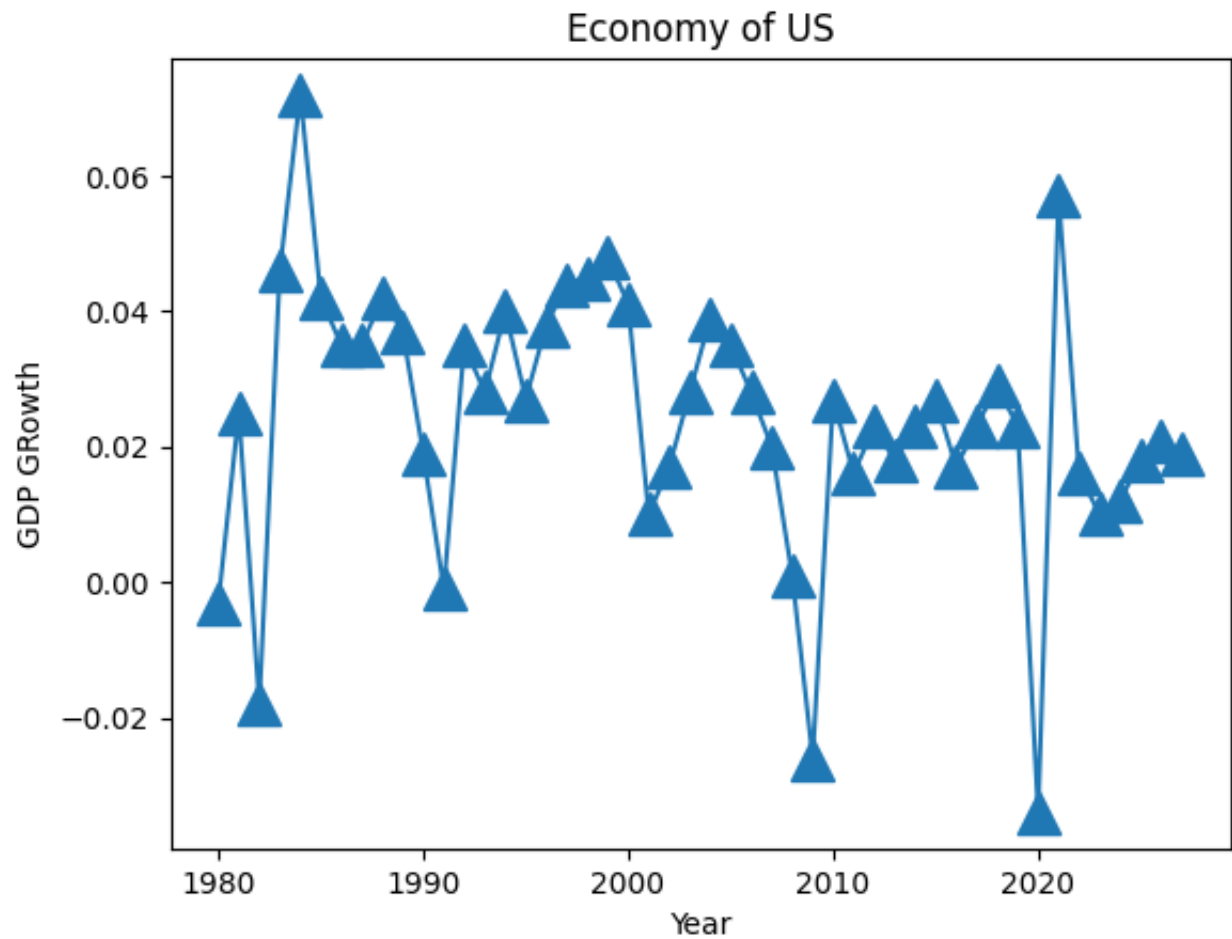


## Scatter plot

m
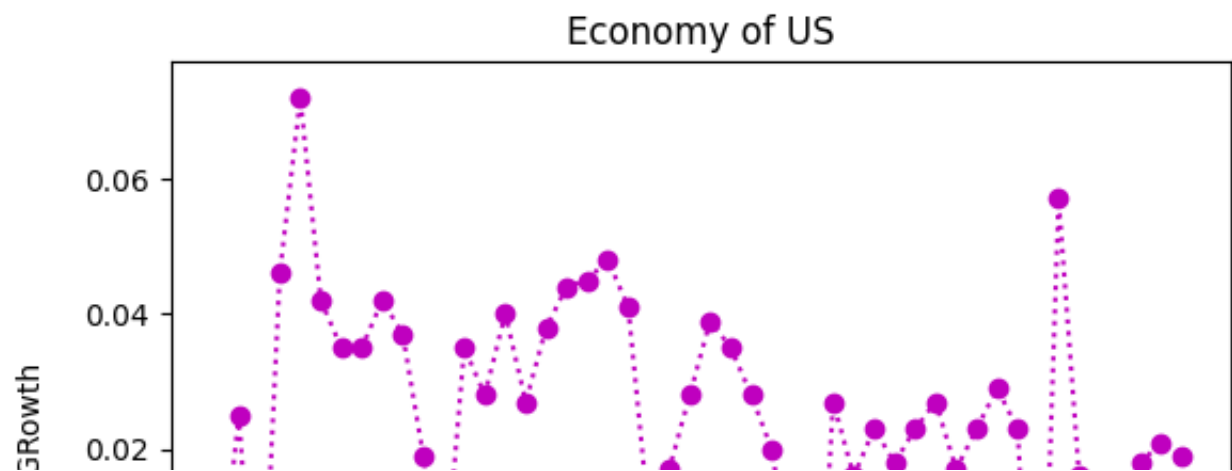
```
plt.plot(df['Year'], df['GDP_Growth'], 'o')
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
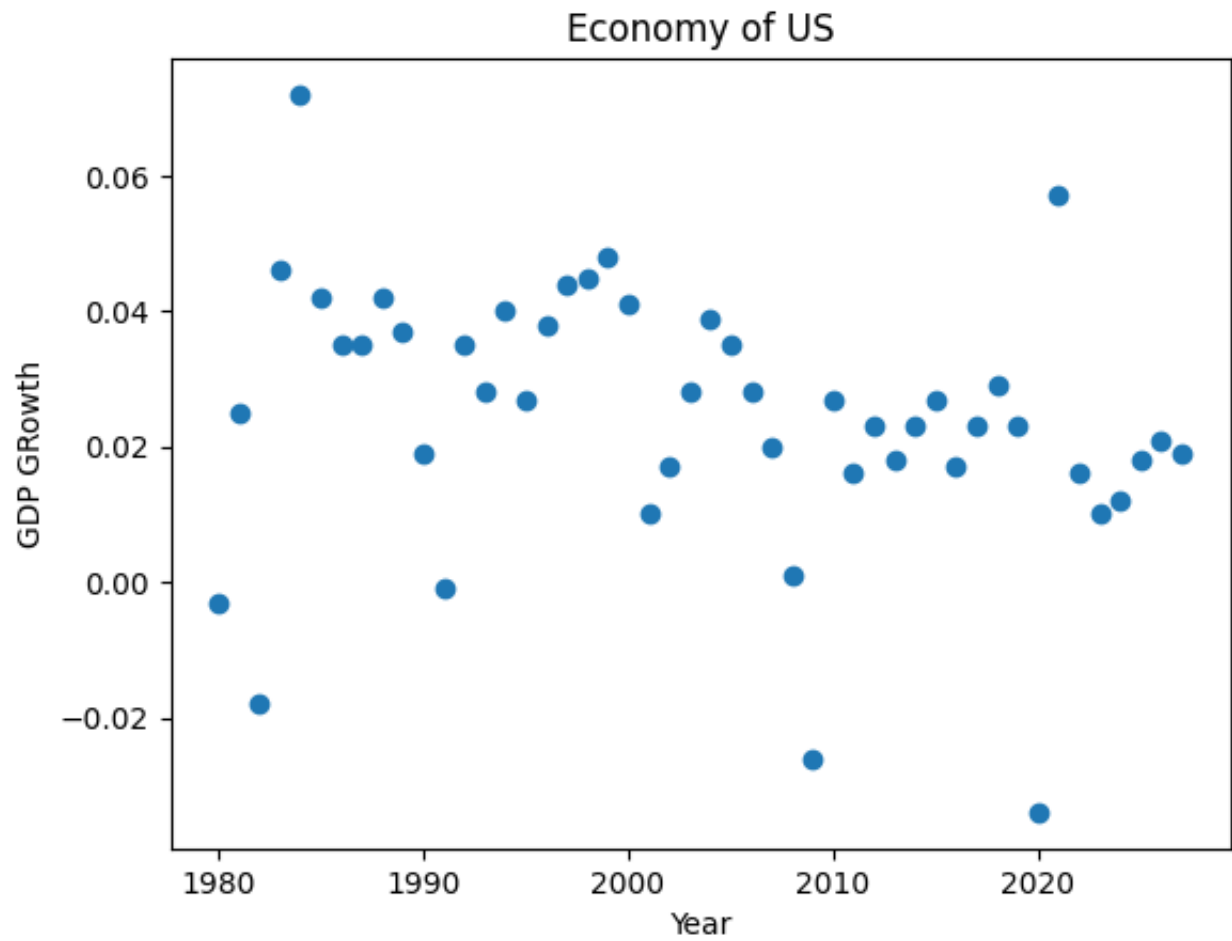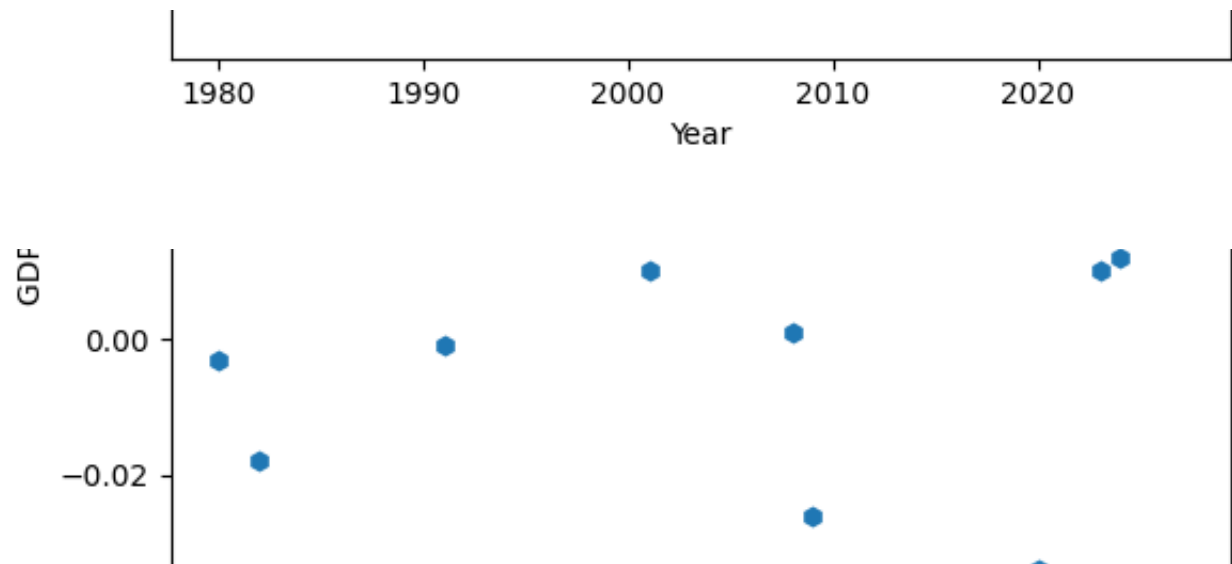
Text(0.5, 1.0, 'Economy of US')
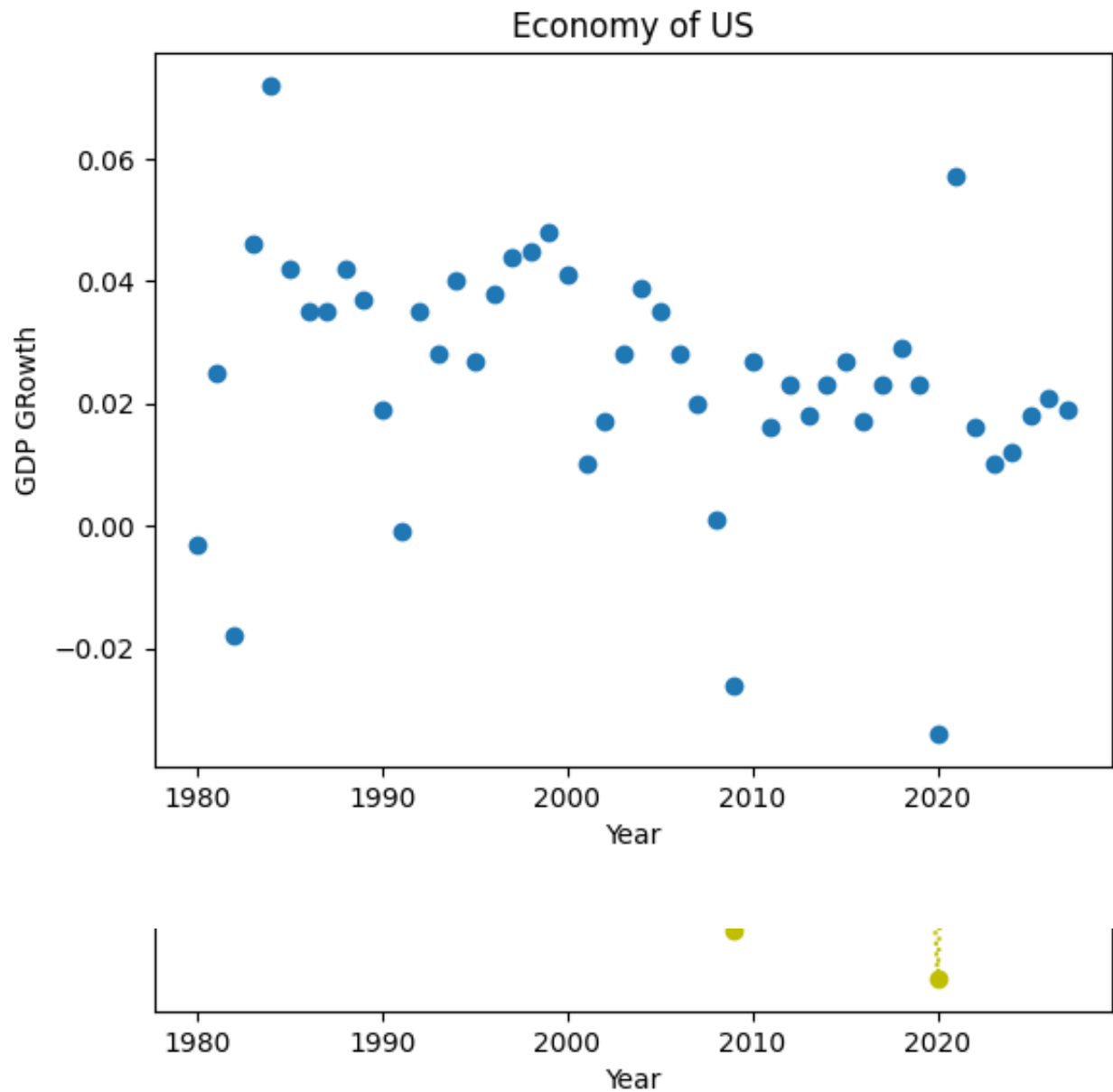


k

```
plt.scatter(df['Year'], df['GDP_Growth'])
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
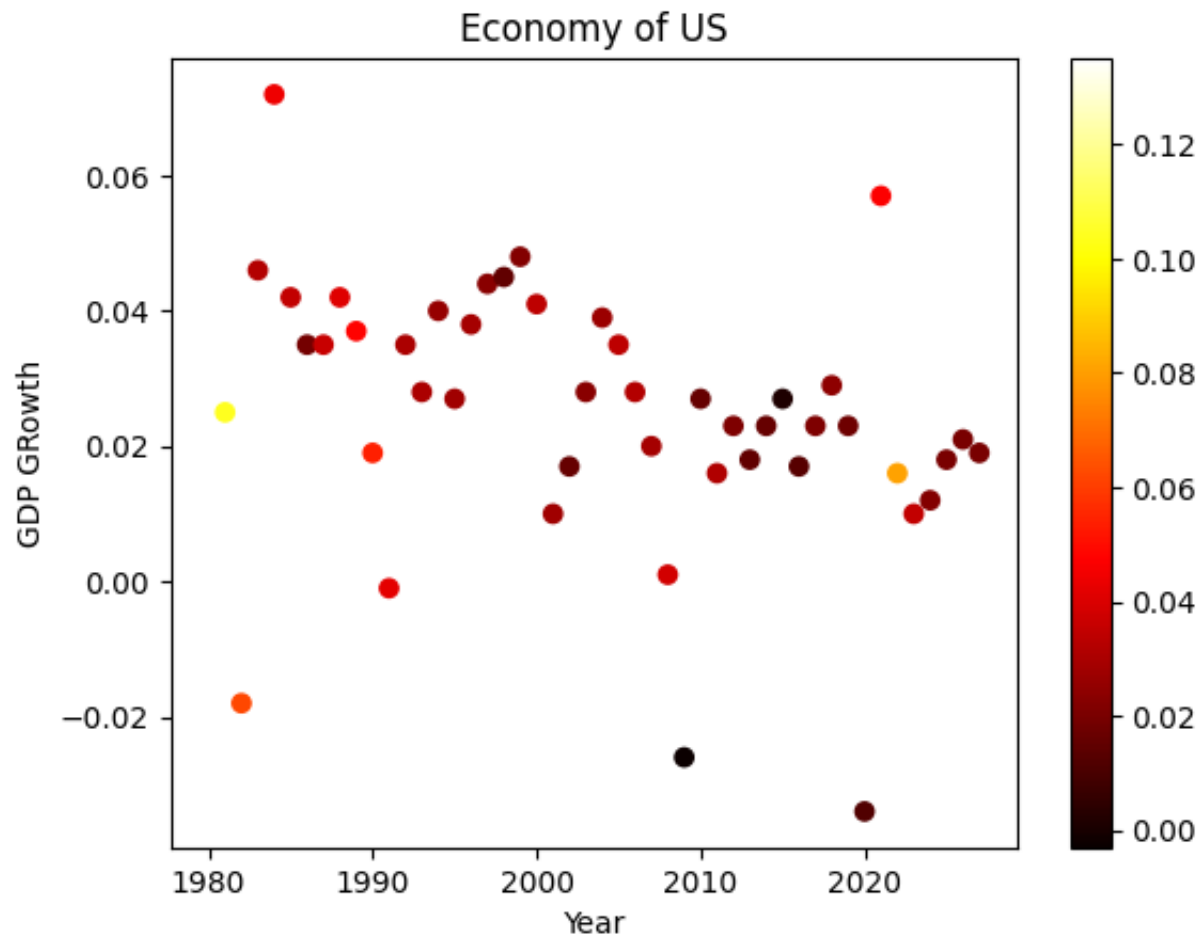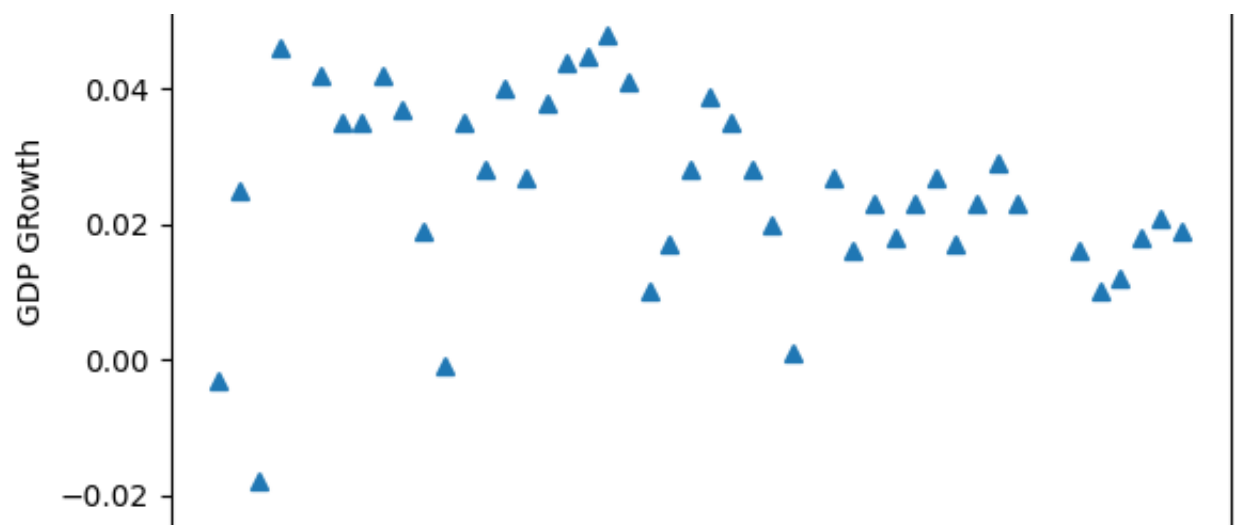
Text(0.5, 1.0, 'Economy of US')



▼ colorbar

```
plt.scatter(df['Year'], df['GDP_Growth'], c=df['Inflation'], cmap='hot')
plt.colorbar()
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
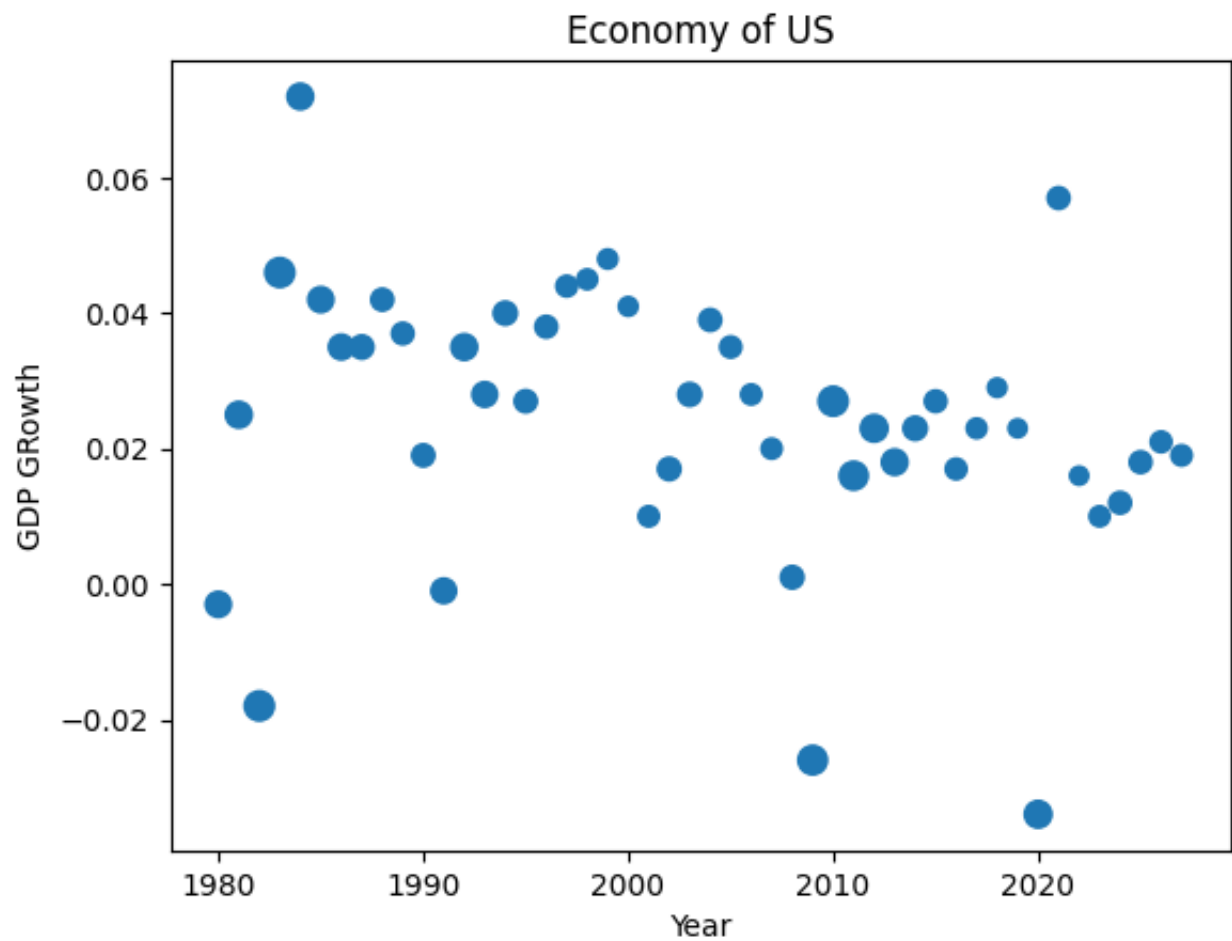
Text(0.5, 1.0, 'Economy of US')



▾ size

```
plt.scatter(df['Year'], df['GDP_Growth'], s= df['Unemployment']*1000)
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
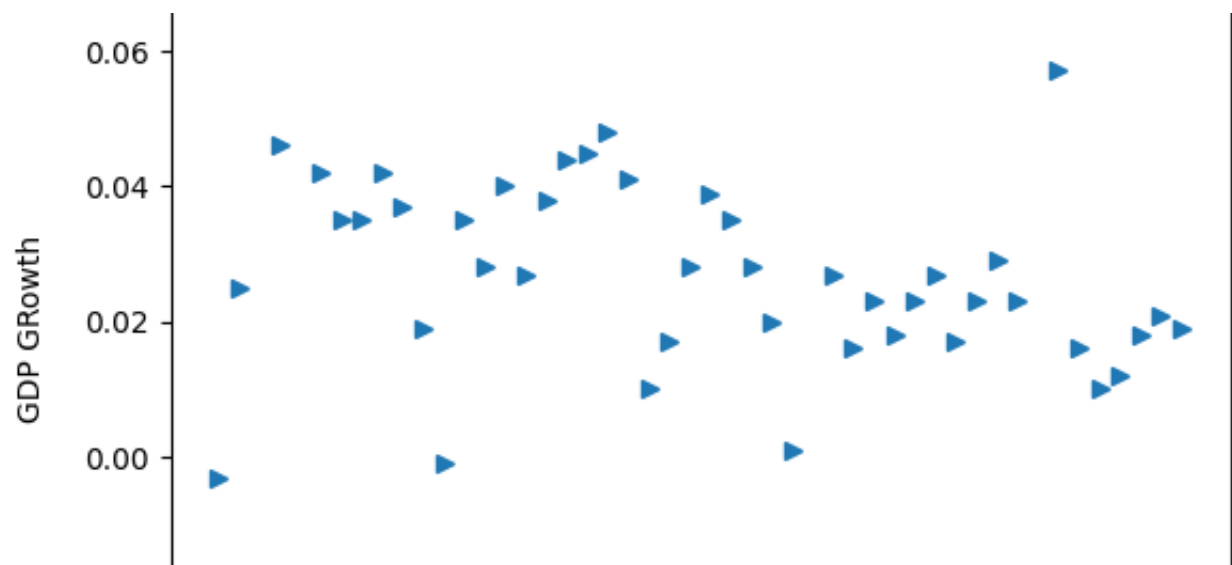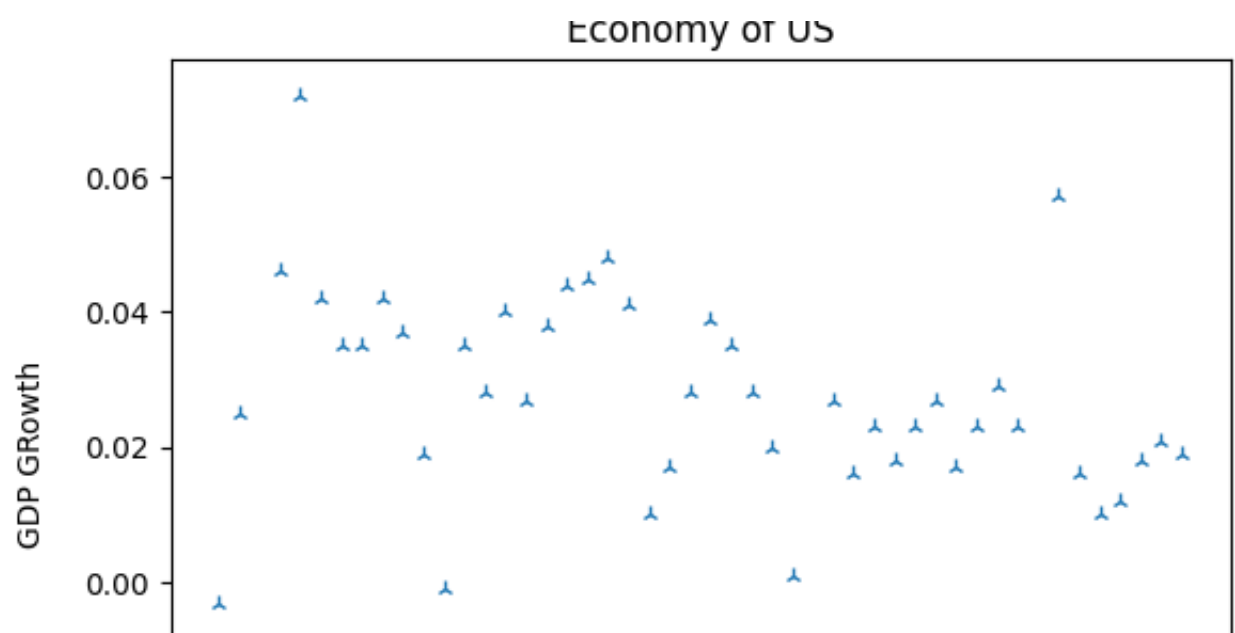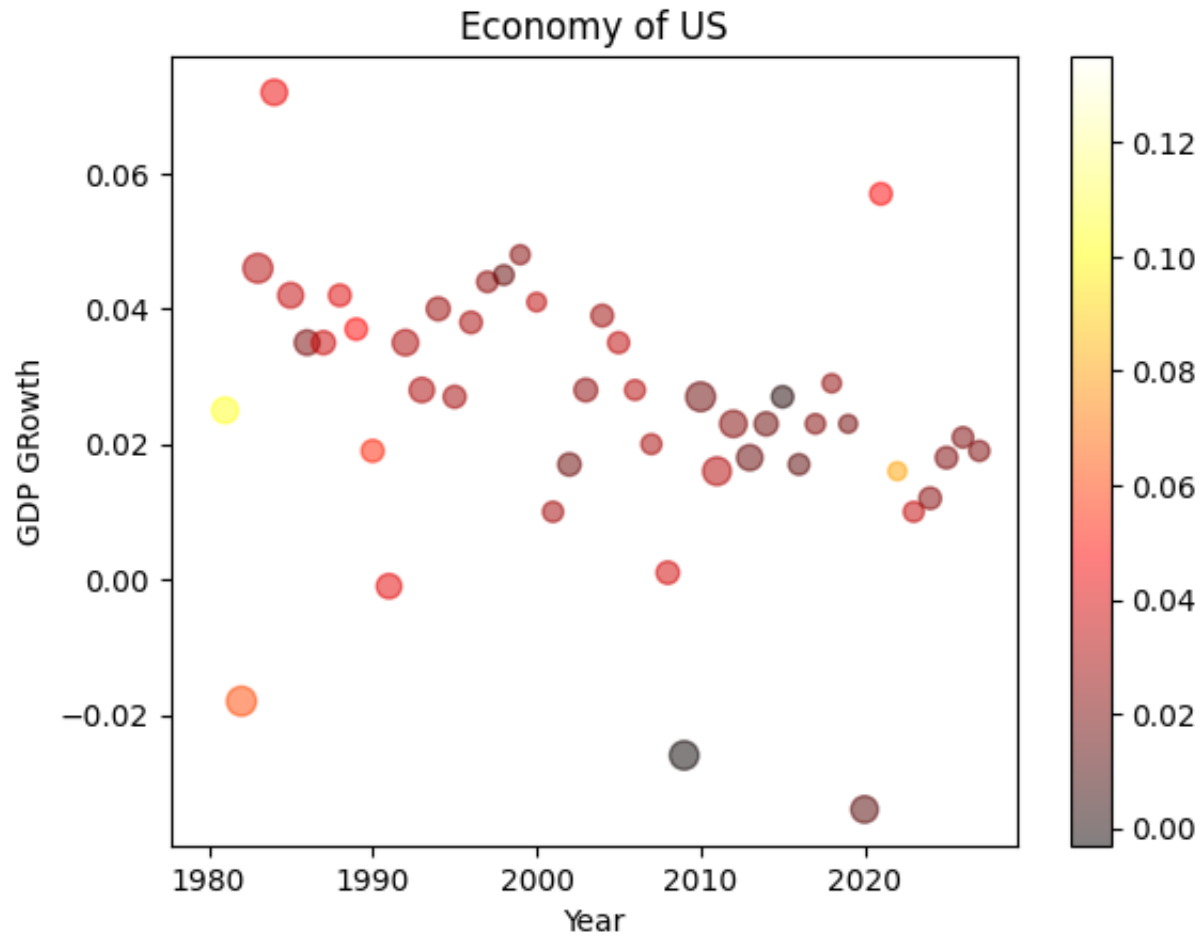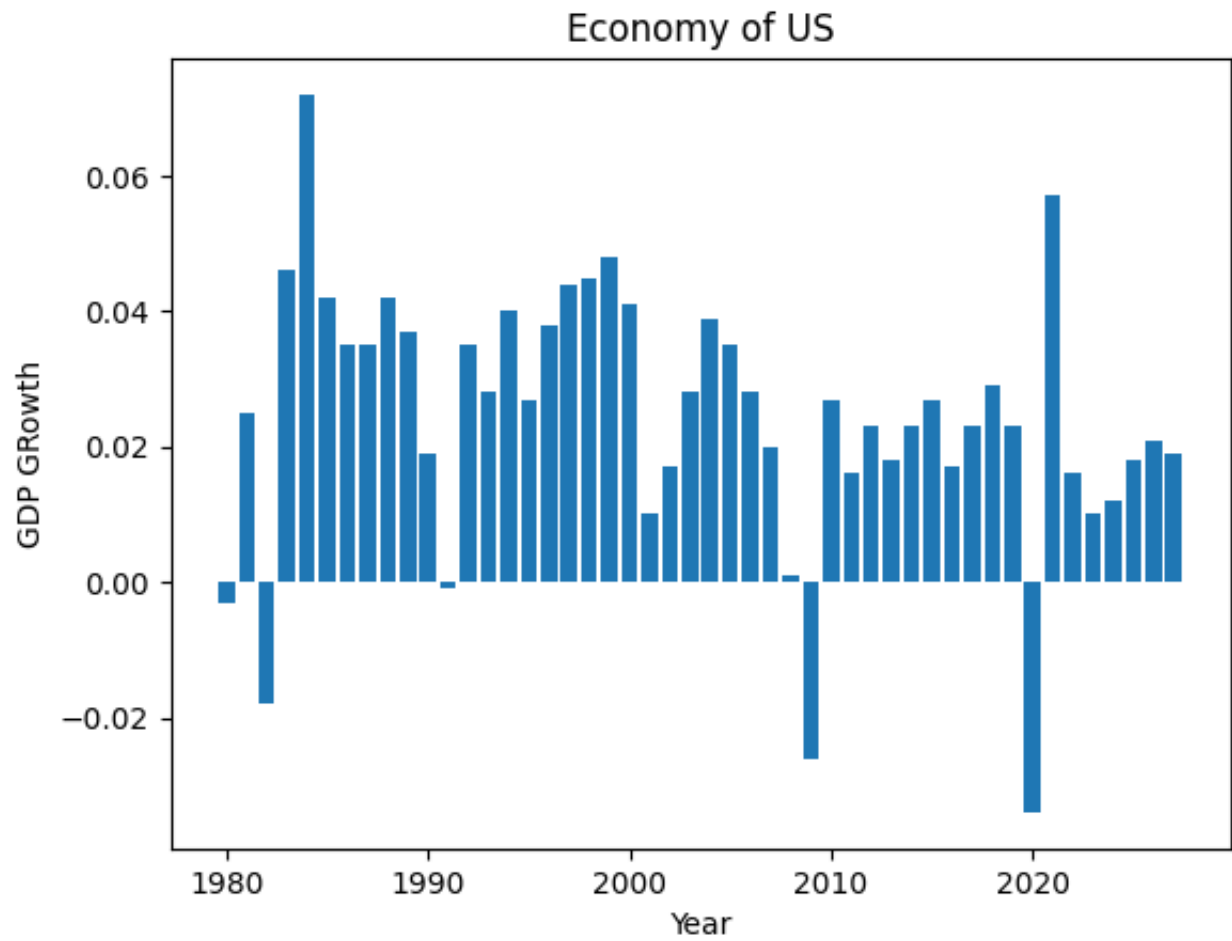
Text(0.5, 1.0, 'Economy of US')



▼ colorbar and size

```
plt.scatter(df['Year'], df['GDP_Growth'], c=df['Inflation'], cmap='hot', alpha = 0
plt.colorbar()
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
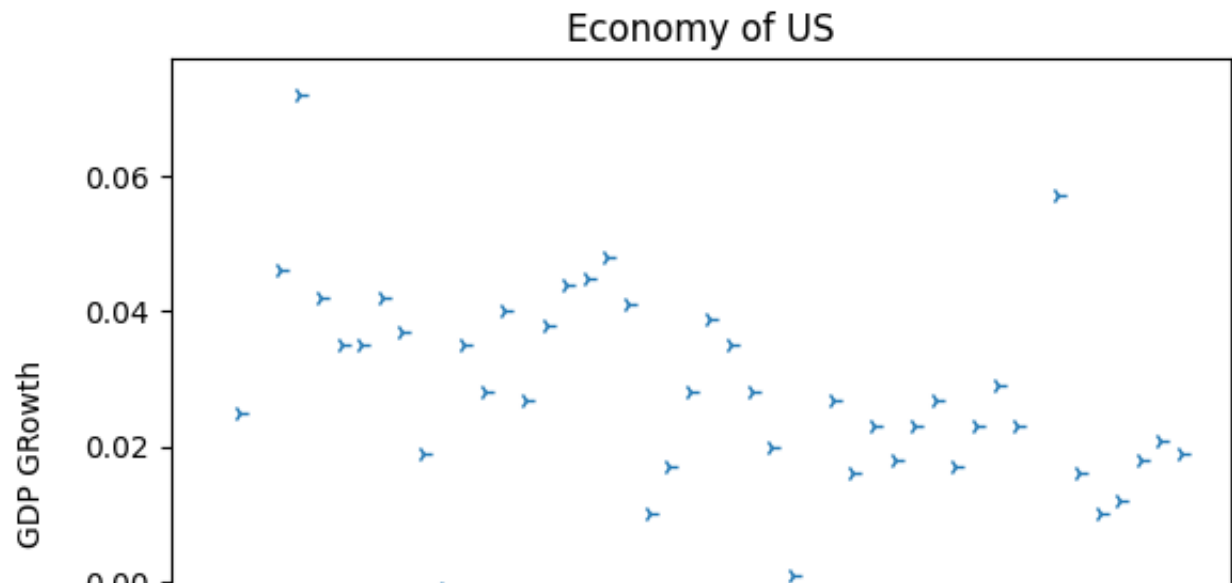
Text(0.5, 1.0, 'Economy of US')

```
plt.bar(df['Year'], df['GDP_Growth'])
plt.xlabel('Year')
plt.ylabel('GDP GRowth')
plt.title('Economy of US')
```
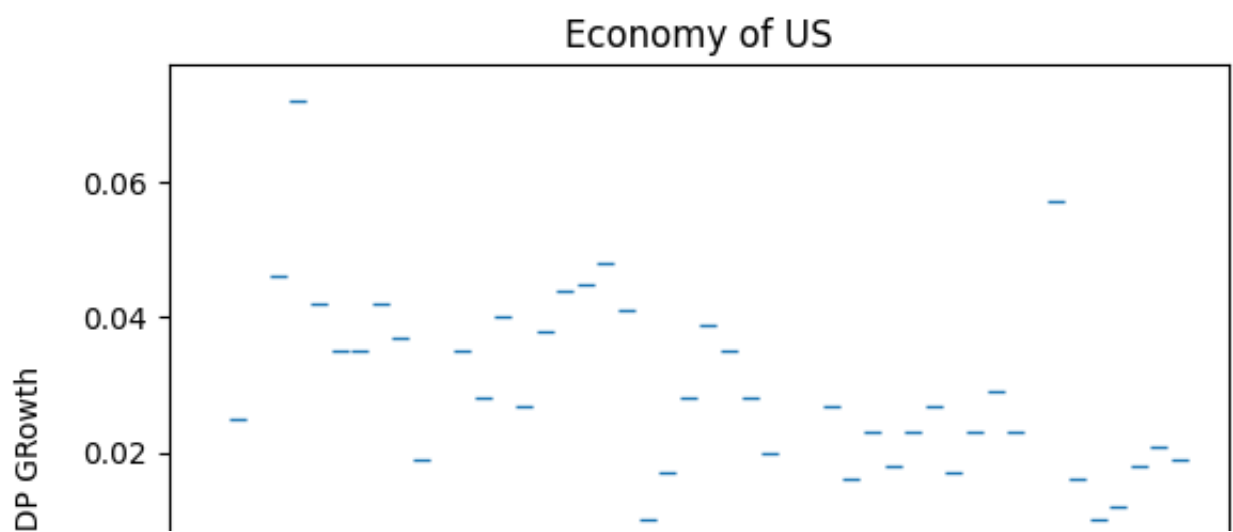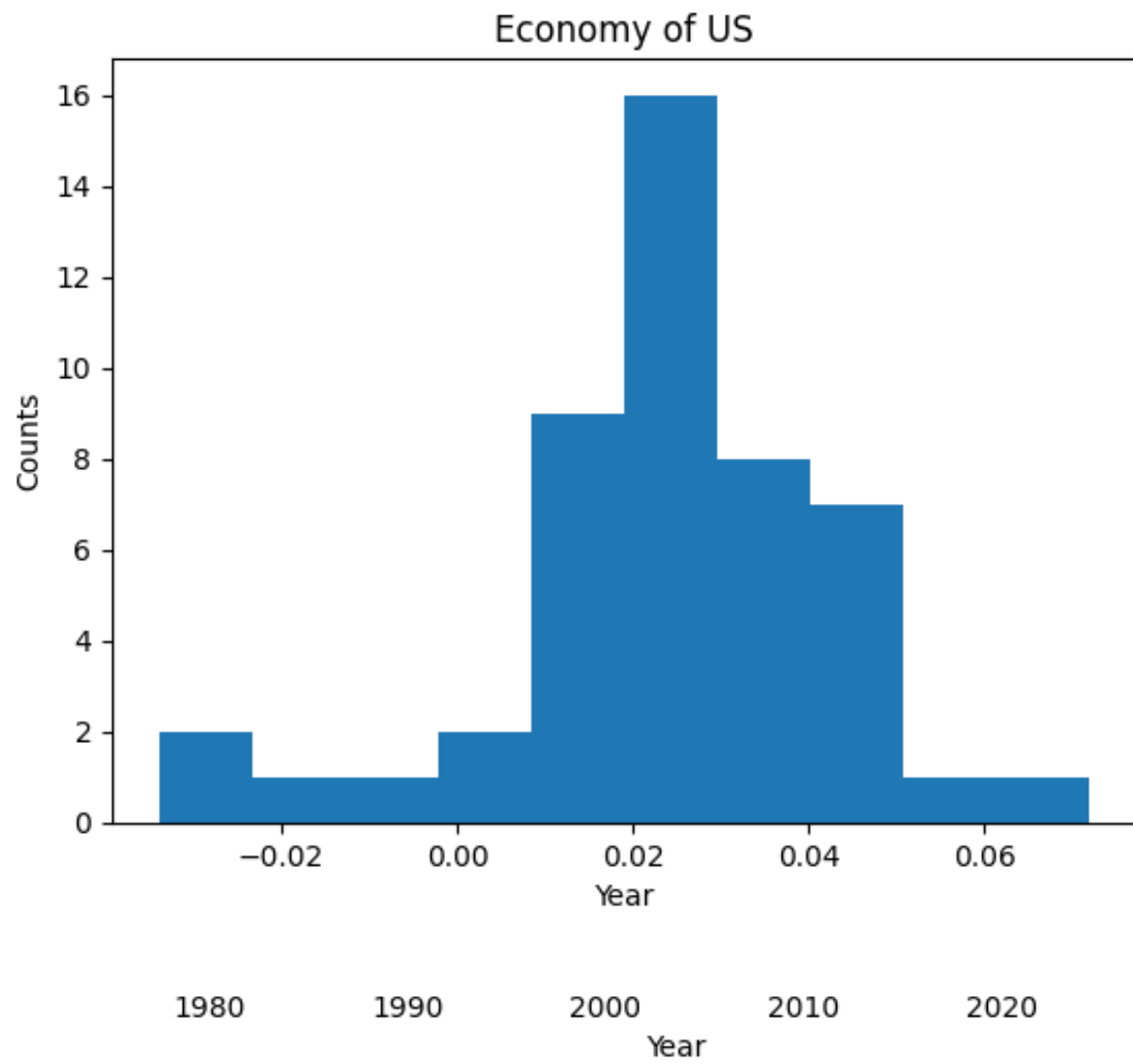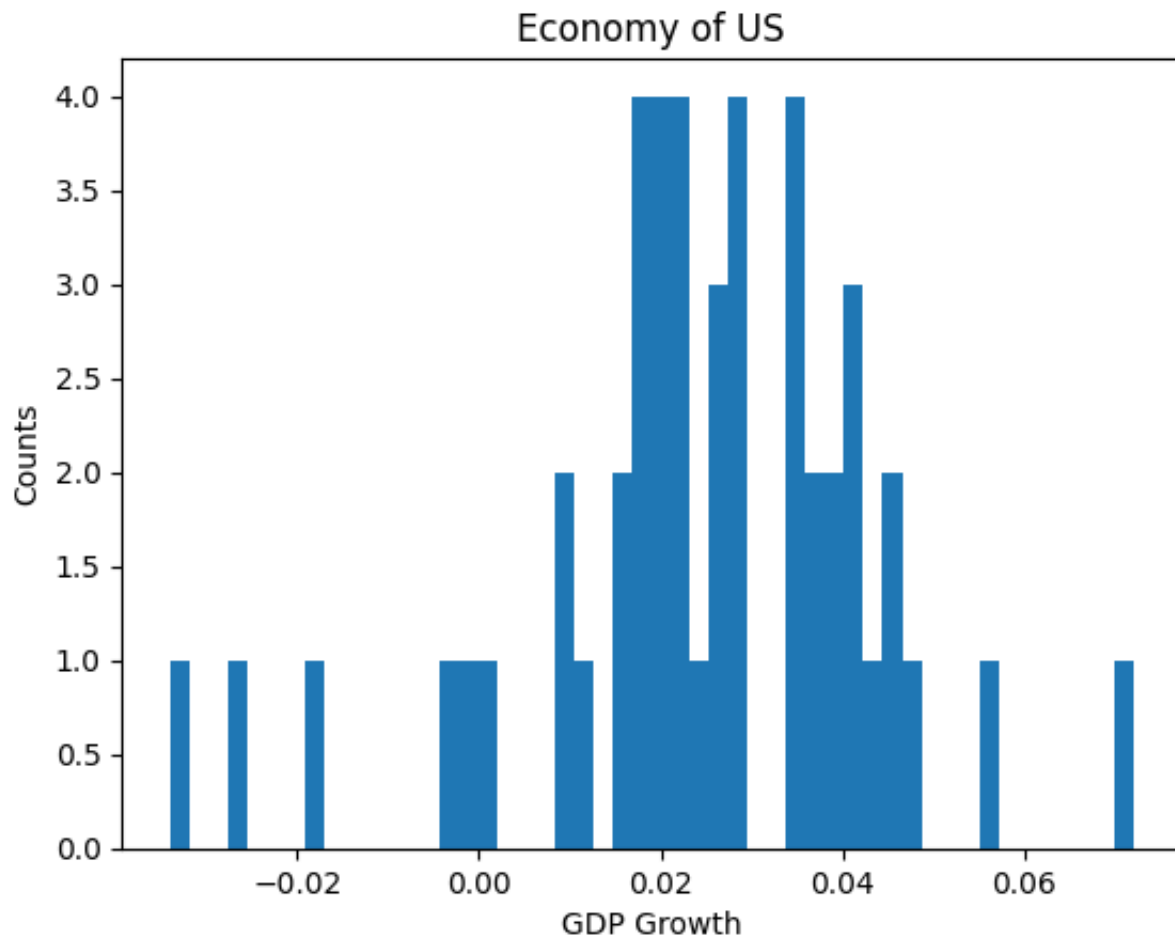
Text(0.5, 1.0, 'Economy of US')



4

```
plt.hist(df['GDP_Growth'])
plt.xlabel('GDP Growth')
plt.ylabel('Counts')
plt.title('Economy of US')
```

Text(0.5, 1.0, 'Economy of US')

```
plt.hist(df['GDP_Growth'], bins = 50)
plt.xlabel('GDP Growth')
plt.ylabel('Counts')
plt.title('Economy of US')
```
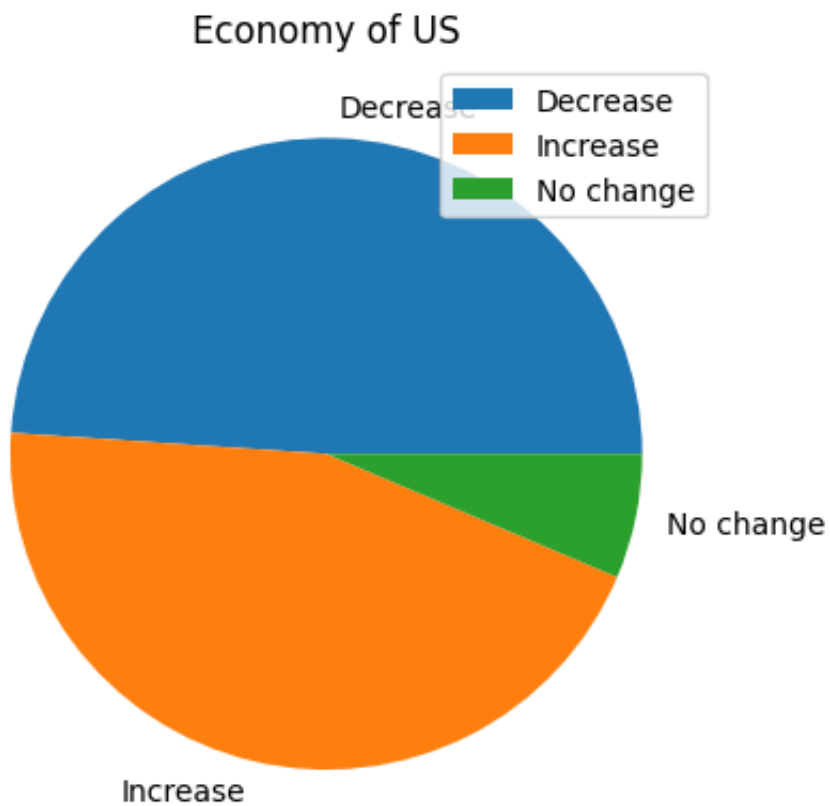
Text(0.5, 1.0, 'Economy of US')



## Pie plot

```
df['Inflation_Change'].value_counts()
```

```
Decrease     23
Increase     21
No change     3
Name: Inflation_Change, dtype: int64
```
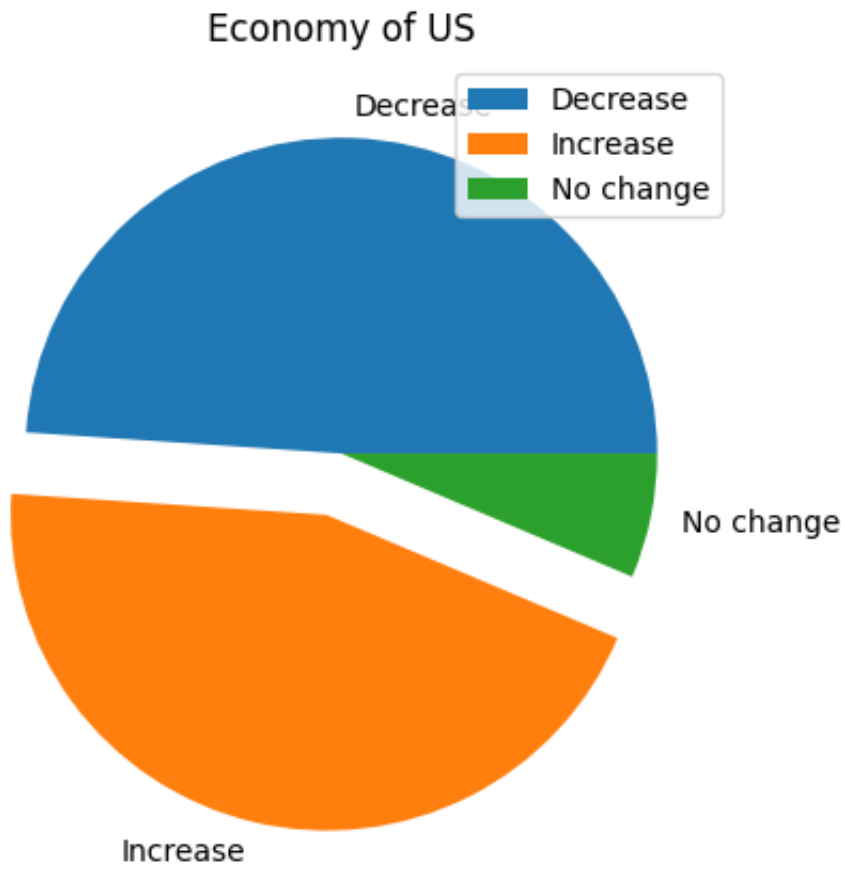
```
plt.pie(df['Inflation_Change'].value_counts(), labels = ['Decrease', 'Increase', '
plt.legend()
plt.title('Economy of US')
```

Text(0.5, 1.0, 'Economy of US')

## Economy of US

```
plt.pie(df['Inflation_Change'].value_counts(), labels = ['Decrease', 'Increase', 'I
plt.legend()
plt.title('Economy of US')
```

Text(0.5, 1.0, 'Economy of US')



Economy of US

- Box plot

```
plt.boxplot(df['Inflation'])
plt.ylabel('Inflation')
plt.title('Economy of US')
```
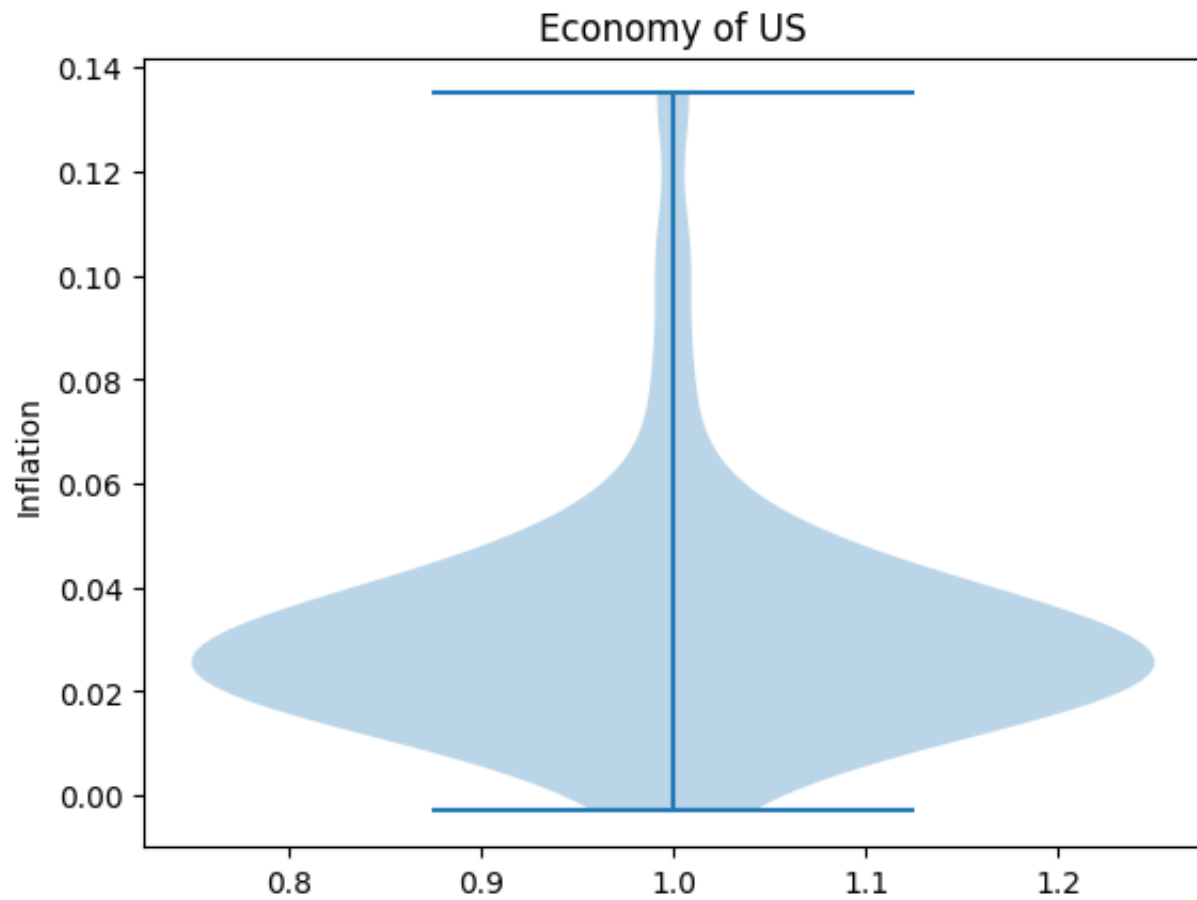
    Text(0.5, 1.0, 'Economy of US')



## Violinplot

```
plt.violinplot(df['Inflation'])
plt.ylabel('Inflation')
plt.title('Economy of US')
```

Text(0.5, 1.0, 'Economy of US')



## Multiplots

```
plt.plot(df['Year'], df['GDP_Growth'])
plt.plot(df['Year'], df['Inflation'])
plt.plot(df['Year'], df['Unemployment'])
plt.xlabel('Year')
plt.title('Economy of US')
```
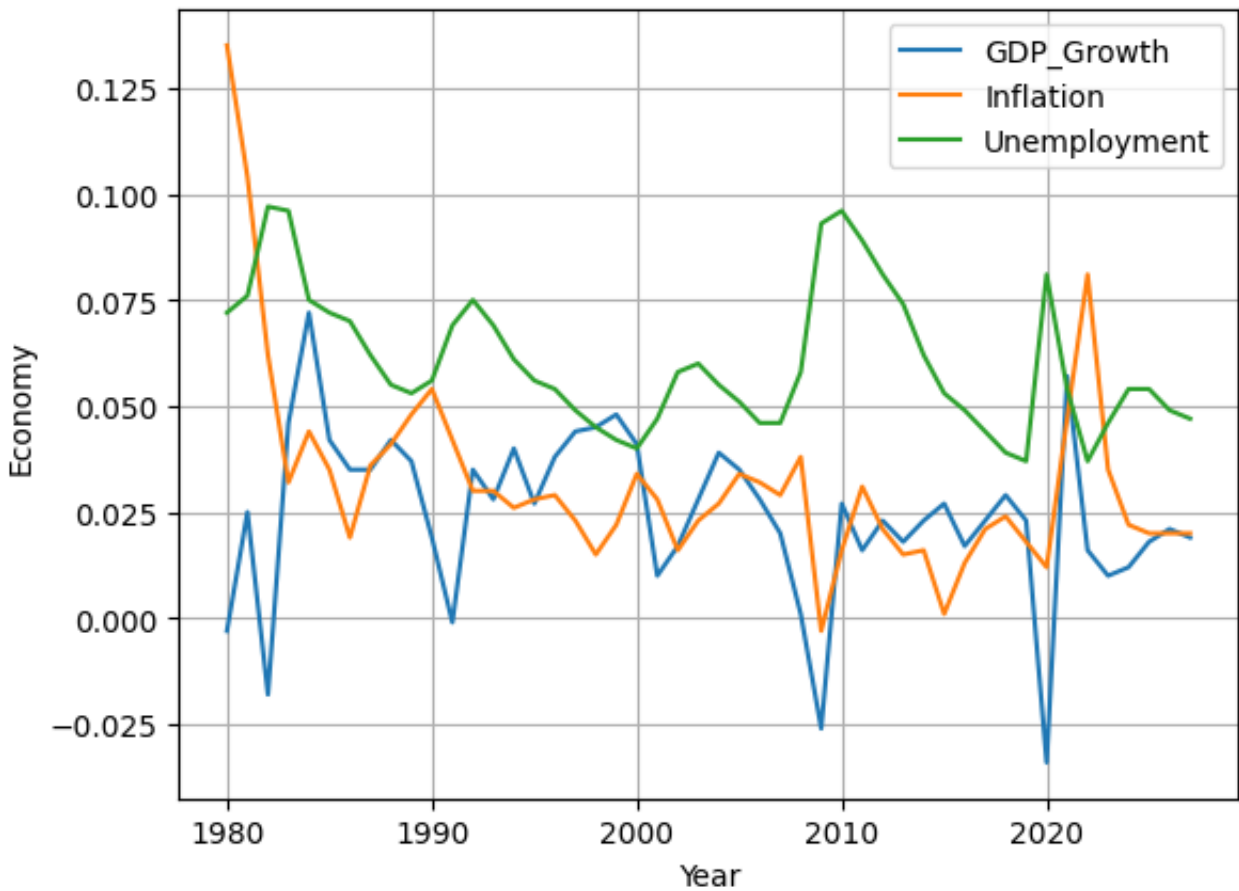
Text(0.5, 1.0, 'Economy of US')



▾ Add legend

```
plt.plot(df['Year'], df['GDP_Growth'], label = 'GDP_Growth')
plt.plot(df['Year'], df['Inflation'], label = 'Inflation' )
plt.plot(df['Year'], df['Unemployment'], label = 'Unemployment')
plt.xlabel('Year')
plt.ylabel('Economy')
plt.grid()
plt.legend()
```
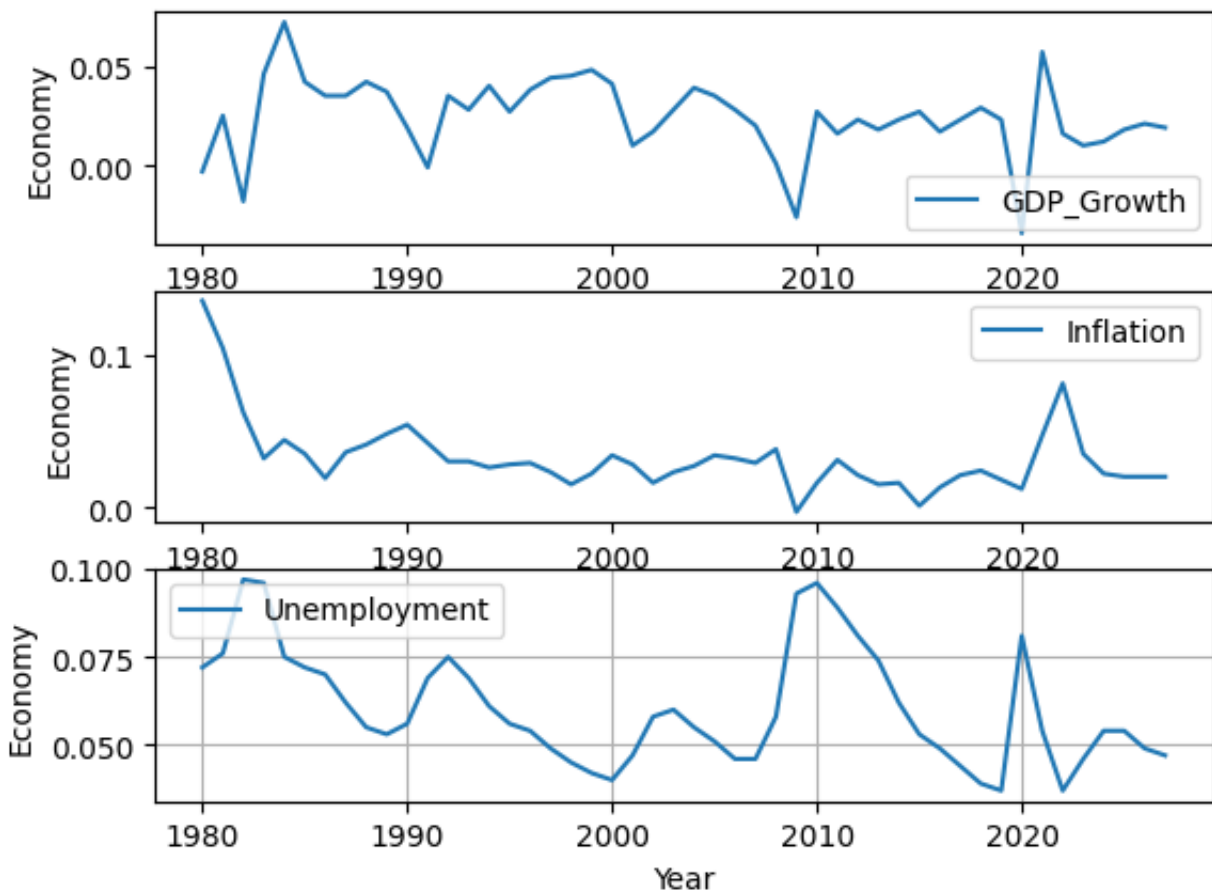
<matplotlib.legend.Legend at 0x7f27844e3e20>



▾ Change arrangement

```
plt.subplot(3, 1, 1)
plt.plot(df['Year'], df['GDP_Growth'], label = 'GDP_Growth')
plt.legend()
plt.xlabel('Year')
plt.ylabel('Economy')
plt.subplot(3, 1, 2)
plt.plot(df['Year'], df['Inflation'], label = 'Inflation' )
plt.legend()
plt.xlabel('Year')
plt.ylabel('Economy')
plt.subplot(3, 1, 3)
plt.plot(df['Year'], df['Unemployment'], label = 'Unemployment')
plt.legend()
plt.xlabel('Year')
plt.ylabel('Economy')
plt.grid()
```
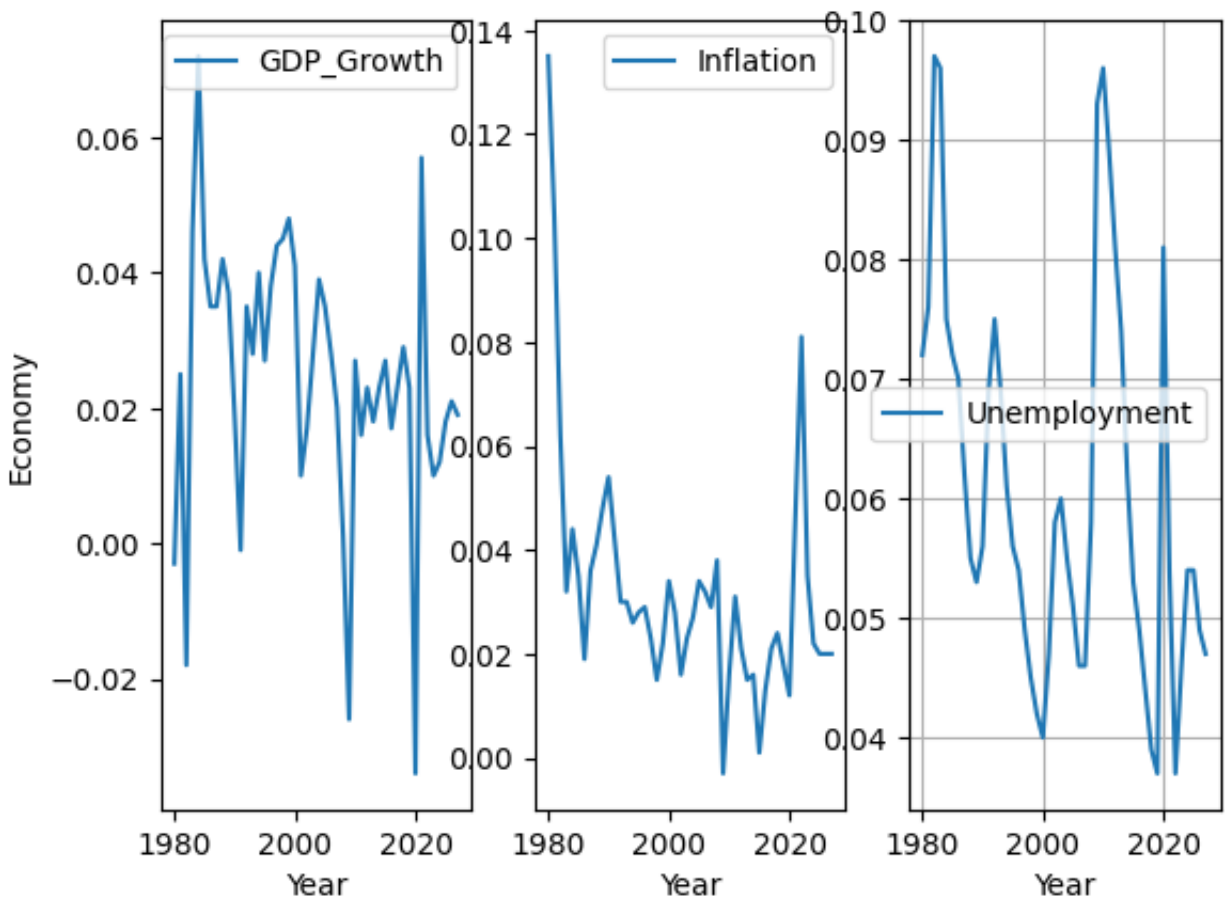
```
plt.subplot(1, 3, 1)
plt.plot(df['Year'], df['GDP_Growth'], label = 'GDP_Growth')
plt.legend()
plt.xlabel('Year')
plt.ylabel('Economy')
plt.subplot(1, 3, 2)
plt.plot(df['Year'], df['Inflation'], label = 'Inflation' )
plt.legend()
plt.xlabel('Year')
plt.subplot(1, 3, 3)
plt.plot(df['Year'], df['Unemployment'], label = 'Unemployment')
plt.legend()
plt.xlabel('Year')
plt.grid()
```

Colab paid products  -  Cancel contracts here