

```
from google.colab import files
```

```
uploaded = files.upload()
```

Choose Files gdp.csv

- **gdp.csv**(n/a) - 43656 bytes, last modified: 12/8/2020 - 100% done

Saving gdp.csv to gdp.csv

```
import numpy as np
import pandas as pd
```

```
import matplotlib.pyplot as plt
import seaborn as sns
```

```
import io
```

```
df = pd.read_csv(io.BytesIO(uploaded['gdp.csv']))
```

```
print(df)
```

v	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991		
1	1961	4.45	NaN	46.2	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
2	1962	4.88	NaN	19.8	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
3	1963	9.17	NaN	24.7	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
4	1964	8.89	NaN	25.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
5	1965	11.30	NaN	22.6	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
6	1966	8.57	NaN	26.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
7	1967	6.77	NaN	23.4	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
8	1968	8.90	NaN	23.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
9	1969	10.10	NaN	23.8	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
10	1970	9.78	NaN	22.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
11	1971	10.90	NaN	18.4	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
12	1972	14.80	NaN	20.4	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
13	1973	12.90	NaN	25.5	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
14	1974	14.00	NaN	38.7	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN			
15	1975	12.70	NaN	33.7	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	22.8	22.0	22.0			
16	1976	13.20	NaN	33.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	21.4	21.4		
Saving... X																																		
20	1980	NaN	23.10	34.3	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	23.4	22.0	22.0		
21	1981	NaN	23.00	34.6	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	19.4	19.4	19.4	
22	1982	NaN	19.40	30.9	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	16.9	16.9	16.9	
23	1983	NaN	18.20	27.9	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	16.4	16.4	16.4	
24	1984	NaN	17.40	25.7	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	20.6	20.6	20.6	
25	1985	NaN	16.20	23.6	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	22.2	22.2	22.2
26	1986	NaN	15.10	12.9	...	6.62	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	24.0	24.0	24.0	
27	1987	NaN	15.50	14.3	...	6.00	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	24.0	24.0	24.0	
28	1988	NaN	16.40	15.5	...	3.95	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	23.7	23.7	23.7		
29	1989	NaN	17.90	18.6	...	23.80	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	23.3	23.3	23.3		
30	1990	NaN	14.90	23.4	...	36.00	12.20	NaN	22.9	22.9	22.9																							
31	1991	NaN	7.22	29.1	...	30.90	11.00	NaN	23.9	23.9	23.9																							

32	1992	NaN	11.50	25.3	...	34.70	10.40	NaN	27.2
33	1993	NaN	15.40	21.8	...	28.70	12.60	NaN	30.7
34	1994	NaN	11.40	22.5	...	34.00	12.50	33.0	34.6
35	1995	NaN	12.50	26.2	...	32.80	22.40	32.9	38.2
36	1996	NaN	11.20	29.8	...	40.90	38.50	28.5	36.1
37	1997	NaN	9.75	30.9	...	43.10	36.30	27.4	37.6
38	1998	NaN	10.80	22.6	...	44.80	26.50	24.6	43.4
39	1999	NaN	15.80	28.2	...	50.00	34.80	25.0	37.4
40	2000	NaN	17.90	42.1	...	53.90	41.40	23.9	38.2
41	2001	NaN	18.40	36.7	...	55.10	35.90	25.1	35.0
42	2002	32.40	19.60	35.5	...	54.70	37.00	27.1	31.8
43	2003	43.60	20.40	38.2	...	56.70	36.40	25.7	32.4
44	2004	34.00	22.00	40.1	...	59.70	36.40	33.5	34.5
45	2005	27.40	22.80	47.2	...	63.70	40.90	30.6	33.5
46	2006	26.50	24.90	48.8	...	67.70	41.30	32.6	36.0
47	2007	17.80	28.10	47.1	...	70.50	35.90	33.6	37.8
48	2008	18.00	25.30	48.0	...	70.30	37.80	28.9	41.5
49	2009	14.70	25.20	35.4	...	62.60	28.30	29.3	21.8
50	2010	10.00	28.00	38.4	...	72.00	30.00	37.0	35.2
51	2011	6.11	29.20	38.8	...	79.40	30.30	40.5	40.6
52	2012	5.52	28.90	36.9	...	80.00	24.90	40.1	30.2
53	2013	6.31	28.90	33.2	...	83.60	22.40	40.5	27.2
54	2014	6.57	28.20	30.2	...	86.40	21.50	38.8	25.7
55	2015	7.00	27.30	23.2	...	89.80	10.90	37.1	23.5
56	2016	6.90	28.90	21.0	...	93.60	3.58	35.3	24.7
57	2017	NaN	31.50	24.0	...	102.00	NaN	35.2	24.1

[58 rows x 186 columns]

Since, this is a GDP data set with null values make sure that the null value isn't filled by zero. Since, a country's GDP can't be zero. If filled with zero and the analysis is done, wrong interpretation will be produced.

```
df.isna().sum()
```

Year	0
Afghanistan	24
Albania	20
Algeria	0
Angola	31

Saving...

Vietnam	20
Yemen	31
Zambia	34
Zimbabwe	15

Length: 186, dtype: int64

```
df['Afghanistan']=df['Afghanistan'].fillna(0)
df['Albania']=df['Albania'].fillna(0)
df['Algeria']=df['Algeria'].fillna(0)
df['Angola']=df['Angola'].fillna(0)
df['Antigua and Barbuda']=df['Antigua and Barbuda'].fillna(0)
```

```
df['Argentina']=df['Argentina'].fillna(0)
df['Armenia']=df['Armenia'].fillna(0)
df['Australia']=df['Australia'].fillna(0)
df['Austria']=df['Austria'].fillna(0)
df['Azerbaijan']=df['Azerbaijan'].fillna(0)
df['Bahamas']=df['Bahamas'].fillna(0)
df['Bahrain']=df['Bahrain'].fillna(0)
df['Bangladesh']=df['Bangladesh'].fillna(0)
df['Barbados']=df['Barbados'].fillna(0)
df['Belarus']=df['Belarus'].fillna(0)
df['Belgium']=df['Belgium'].fillna(0)
df['Belize']=df['Belize'].fillna(0)
df['Benin']=df['Benin'].fillna(0)
df['Bhutan']=df['Bhutan'].fillna(0)
df['Bolivia']=df['Bolivia'].fillna(0)
df['Bosnia and Herzegovina']=df['Bosnia and Herzegovina'].fillna(0)
df['Botswana']=df['Botswana'].fillna(0)
df['Brazil']=df['Brazil'].fillna(0)
df['Brunei']=df['Brunei'].fillna(0)
df['Bulgaria']=df['Bulgaria'].fillna(0)
df['Burkina Faso']=df['Burkina Faso'].fillna(0)
df['Burundi']=df['Burundi'].fillna(0)
df['Cambodia']=df['Cambodia'].fillna(0)
df['Cameroon']=df['Cameroon'].fillna(0)
df['Canada']=df['Canada'].fillna(0)
df['Cape Verde']=df['Cape Verde'].fillna(0)
df['Central African Republic']=df['Central African Republic'].fillna(0)
df['Chad']=df['Chad'].fillna(0)
df['Chile']=df['Chile'].fillna(0)
df['Colombia']=df['Colombia'].fillna(0)
df['Comoros']=df['Comoros'].fillna(0)
df['Congo, Dem. Rep.']=df['Congo, Dem. Rep.'].fillna(0)
df['Congo, Rep.']=df['Congo, Rep.'].fillna(0)
df['Costa Rica']=df['Costa Rica'].fillna(0)
df['Cote d'Ivoire']=df['Cote d'Ivoire'].fillna(0)
df['Croatia']=df['Croatia'].fillna(0)
df['Cuba']=df['Cuba'].fillna(0)
df['Cyprus']=df['Cyprus'].fillna(0)
df['Czech Republic']=df['Czech Republic'].fillna(0)
```

Saving...

X)
(0)

```
df['Dominica']=df['Dominica'].fillna(0)
df['Dominican Republic']=df['Dominican Republic'].fillna(0)
df['Ecuador']=df['Ecuador'].fillna(0)
df['Egypt']=df['Egypt'].fillna(0)
df['El Salvador']=df['El Salvador'].fillna(0)
df['Equatorial Guinea']=df['Equatorial Guinea'].fillna(0)
df['Eritrea']=df['Eritrea'].fillna(0)
df['Estonia']=df['Estonia'].fillna(0)
df['Ethiopia']=df['Ethiopia'].fillna(0)
df['Fiji']=df['Fiji'].fillna(0)
df['Finland']=df['Finland'].fillna(0)
```

```
df['France']=df['France'].fillna(0)
df['Gabon']=df['Gabon'].fillna(0)
df['Gambia']=df['Gambia'].fillna(0)
df['Georgia']=df['Georgia'].fillna(0)
df['Germany']=df['Germany'].fillna(0)
df['Germany']=df['Germany'].fillna(0)
df['Ghana']=df['Ghana'].fillna(0)
df['Greece']=df['Greece'].fillna(0)
df['Grenada']=df['Grenada'].fillna(0)
df['Guatemala']=df['Guatemala'].fillna(0)
df['Guinea']=df['Guinea'].fillna(0)
df['Guinea-Bissau']=df['Guinea-Bissau'].fillna(0)
df['Guyana']=df['Guyana'].fillna(0)
df['Haiti']=df['Haiti'].fillna(0)
df['Honduras']=df['Honduras'].fillna(0)
df['Hungary']=df['Hungary'].fillna(0)
df['Iceland']=df['Iceland'].fillna(0)
df['India']=df['India'].fillna(0)
df['Indonesia']=df['Indonesia'].fillna(0)
df['Iran']=df['Iran'].fillna(0)
df['Iraq']=df['Iraq'].fillna(0)
df['Ireland']=df['Ireland'].fillna(0)
df['Israel']=df['Israel'].fillna(0)
df['Italy']=df['Italy'].fillna(0)
df['Jamaica']=df['Jamaica'].fillna(0)
df['Japan']=df['Japan'].fillna(0)
df['Jordan']=df['Jordan'].fillna(0)
df['Kazakhstan']=df['Kazakhstan'].fillna(0)
df['Kenya']=df['Kenya'].fillna(0)
df['Kiribati']=df['Kiribati'].fillna(0)
df['Kuwait']=df['Kuwait'].fillna(0)
df['Kyrgyz Republic']=df['Kyrgyz Republic'].fillna(0)
df['Lao']=df['Lao'].fillna(0)
df['Latvia']=df['Latvia'].fillna(0)
df['Lebanon']=df['Lebanon'].fillna(0)
df['Lesotho']=df['Lesotho'].fillna(0)
df['Liberia']=df['Liberia'].fillna(0)
df['Libya']=df['Libya'].fillna(0)
```

Saving...



```
df['Macedonia, FYR']=df['Macedonia, FYR'].fillna(0)
df['Madagascar']=df['Madagascar'].fillna(0)
df['Malawi']=df['Malawi'].fillna(0)
df['Malaysia']=df['Malaysia'].fillna(0)
df['Maldives']=df['Maldives'].fillna(0)
df['Mali']=df['Mali'].fillna(0)
df['Malta']=df['Malta'].fillna(0)
df['Marshall Islands']=df['Marshall Islands'].fillna(0)
df['Mauritania']=df['Mauritania'].fillna(0)
df['Mauritius']=df['Mauritius'].fillna(0)
df['Mexico']=df['Mexico'].fillna(0)
```

```
        ຖະລາຍດີ, ແກສ. ສປ. ຈຸນລາຍດີ, ແກສ. ສປ. ຈຸນລາຍດີ, ພຣິຕິ  
df['Moldova']=df['Moldova'].fillna(0)  
df['Mongolia']=df['Mongolia'].fillna(0)  
df['Montenegro']=df['Montenegro'].fillna(0)  
df['Morocco']=df['Morocco'].fillna(0)  
df['Mozambique']=df['Mozambique'].fillna(0)  
df['Myanmar']=df['Myanmar'].fillna(0)  
df['Namibia']=df['Namibia'].fillna(0)  
df['Nauru']=df['Nauru'].fillna(0)  
df['Nepal']=df['Nepal'].fillna(0)  
df['Netherlands']=df['Netherlands'].fillna(0)  
df['New Zealand']=df['New Zealand'].fillna(0)  
df['Nicaragua']=df['Nicaragua'].fillna(0)  
df['Niger']=df['Niger'].fillna(0)  
df['Nigeria']=df['Nigeria'].fillna(0)  
df['Niger']=df['Niger'].fillna(0)  
df['Norway']=df['Norway'].fillna(0)  
df['Oman']=df['Oman'].fillna(0)  
df['Pakistan']=df['Pakistan'].fillna(0)  
df['Palau']=df['Palau'].fillna(0)  
df['Palestine']=df['Palestine'].fillna(0)  
df['Panama']=df['Panama'].fillna(0)  
df['Papua New Guinea']=df['Papua New Guinea'].fillna(0)  
df['Paraguay']=df['Paraguay'].fillna(0)  
df['Peru']=df['Peru'].fillna(0)  
df['Philippines']=df['Philippines'].fillna(0)  
df['Poland']=df['Poland'].fillna(0)  
df['Portugal']=df['Portugal'].fillna(0)  
df['Romania']=df['Romania'].fillna(0)  
df['Russia']=df['Russia'].fillna(0)  
df['Rwanda']=df['Rwanda'].fillna(0)  
df['Samoa']=df['Samoa'].fillna(0)  
df['Saudi Arabia']=df['Saudi Arabia'].fillna(0)  
df['Senegal']=df['Senegal'].fillna(0)  
df['Serbia']=df['Serbia'].fillna(0)  
df['Seychelles']=df['Seychelles'].fillna(0)  
df['Sierra Leone']=df['Sierra Leone'].fillna(0)  
df['Singapore']=df['Singapore'].fillna(0)  
df['Slovak Republic']=df['Slovak Republic'].fillna(0)  
Saving...  (0)  
lands'].fillna(0)  
df['Somalia']=df['Somalia'].fillna(0)  
df['South Africa']=df['South Africa'].fillna(0)  
df['South Korea']=df['South Korea'].fillna(0)  
df['South Sudan']=df['South Sudan'].fillna(0)  
df['Spain']=df['Spain'].fillna(0)  
df['Sri Lanka']=df['Sri Lanka'].fillna(0)  
df['St. Vincent and the Grenadines']=df['St. Vincent and the Grenadines'].fillna(0)  
df['St. Kitts and Nevis']=df['St. Kitts and Nevis'].fillna(0)  
df['Sudan']=df['Sudan'].fillna(0)  
df['Suriname']=df['Suriname'].fillna(0)  
df['Swaziland']=df['Swaziland'].fillna(0)
```

```
df['Sweden']=df['St. Kitts and Nevis'].fillna(0)
df['Switzerland']=df['Switzerland'].fillna(0)
df['Syria']=df['Syria'].fillna(0)
df['Tajikistan']=df['Tajikistan'].fillna(0)
df['Tanzania']=df['Tanzania'].fillna(0)
df['Thailand']=df['Thailand'].fillna(0)
df['Timor-Leste']=df['Timor-Leste'].fillna(0)
df['Togo']=df['Togo'].fillna(0)
df['Tonga']=df['Tonga'].fillna(0)
df['Tunisia']=df['Tunisia'].fillna(0)
df['Turkey']=df['Turkey'].fillna(0)
df['Turkmenistan']=df['Turkmenistan'].fillna(0)
df['Uganda']=df['Uganda'].fillna(0)
df['Ukraine']=df['Ukraine'].fillna(0)
df['United Arab Emirates']=df['United Arab Emirates'].fillna(0)
df['United Kingdom']=df['United Kingdom'].fillna(0)
df['United States']=df['United States'].fillna(0)
df['Uruguay']=df['Uruguay'].fillna(0)
df['Uzbekistan']=df['Uzbekistan'].fillna(0)
df['Vanuatu']=df['Vanuatu'].fillna(0)
df['Venezuela']=df['Venezuela'].fillna(0)
df['Vietnam']=df['Vietnam'].fillna(0)
df['Yemen']=df['Yemen'].fillna(0)
df['Zambia']=df['Zambia'].fillna(0)
df['Zimbabwe']=df['Zimbabwe'].fillna(0)
```

```
r=pd.to_datetime(df.Year, format='%Y')
```

```
r
```

```
0    1960-01-01
1    1961-01-01
2    1962-01-01
3    1963-01-01
4    1964-01-01
5    1965-01-01
6    1966-01-01
7    1967-01-01
8    1968-01-01
9    1969-01-01
10   1970-01-01
```

Saving...

```
11   1971-01-01
12   1972-01-01
13   1973-01-01
14   1974-01-01
15   1975-01-01
16   1976-01-01
17   1977-01-01
18   1978-01-01
19   1979-01-01
20   1980-01-01
21   1981-01-01
22   1982-01-01
```

```
23 1983-01-01
24 1984-01-01
25 1985-01-01
26 1986-01-01
27 1987-01-01
28 1988-01-01
29 1989-01-01
30 1990-01-01
31 1991-01-01
32 1992-01-01
33 1993-01-01
34 1994-01-01
35 1995-01-01
36 1996-01-01
37 1997-01-01
38 1998-01-01
39 1999-01-01
40 2000-01-01
41 2001-01-01
42 2002-01-01
43 2003-01-01
44 2004-01-01
45 2005-01-01
46 2006-01-01
47 2007-01-01
48 2008-01-01
49 2009-01-01
50 2010-01-01
51 2011-01-01
52 2012-01-01
53 2013-01-01
54 2014-01-01
55 2015-01-01
56 2016-01-01
57 2017-01-01
```

```
Name: Year, dtype: datetime64[ns]
```

```
pivot = df.pivot_table(index=[r], values=['Afghanistan'], aggfunc=[np.median], fill_value=0, margins=True)
```

```
pivot
```

Saving... 

median
Afghanistan

Year	median
1960-01-01	4.13
1961-01-01	4.45
1962-01-01	4.88
1963-01-01	9.17
1964-01-01	8.89
1965-01-01	11.30
1966-01-01	8.57
1967-01-01	6.77
1968-01-01	8.90
1969-01-01	10.10
1970-01-01	9.78
1971-01-01	10.90
1972-01-01	14.80
1973-01-01	12.90
1974-01-01	14.00
1975-01-01	12.70
1976-01-01	13.20
1977-01-01	11.70
1978-01-01	10.80
1979-01-01	0.00

Saving...



1982-01-01	0.00
1983-01-01	0.00
1984-01-01	0.00
1985-01-01	0.00
1986-01-01	0.00
1987-01-01	0.00

1988-01-01	0.00
1989-01-01	0.00
1990-01-01	0.00
1991-01-01	0.00
1992-01-01	0.00
1993-01-01	0.00
1994-01-01	0.00
1995-01-01	0.00
1996-01-01	0.00
1997-01-01	0.00
1998-01-01	0.00
1999-01-01	0.00
2000-01-01	0.00
2001-01-01	0.00
2002-01-01	32.40
2003-01-01	43.60
2004-01-01	34.00
2005-01-01	27.40
2006-01-01	00.00

```
pivot.plot(kind='bar')
```

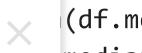
Saving... X

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7af1e6f320>
```



The above graph is misleading. Because, for particular years GDP is found to be none! which is impossible. So, such an analyze can be misinterpreted. Thus, fill the null values with Median.

```
df['Afghanistan']=df['Afghanistan'].fillna(df.median)
df['Albania']=df['Albania'].fillna(df.median)
df['Algeria']=df['Algeria'].fillna(df.median)
df['Angola']=df['Angola'].fillna(df.median)
df['Antigua and Barbuda']=df['Antigua and Barbuda'].fillna(df.median)
df['Argentina']=df['Argentina'].fillna(df.median)
df['Armenia']=df['Armenia'].fillna(df.median)
df['Australia']=df['Australia'].fillna(df.median)
df['Austria']=df['Austria'].fillna(df.median)
df['Azerbaijan']=df['Azerbaijan'].fillna(df.median)
df['Bahamas']=df['Bahamas'].fillna(df.median)
df['Bahrain']=df['Bahrain'].fillna(df.median)
df['Bangladesh']=df['Bangladesh'].fillna(df.median)
df['Barbados']=df['Barbados'].fillna(df.median)
df['Belarus']=df['Belarus'].fillna(df.median)
df['Belgium']=df['Belgium'].fillna(df.median)
df['Belize']=df['Belize'].fillna(df.median)
df['Benin']=df['Benin'].fillna(df.median)
df['Bhutan']=df['Bhutan'].fillna(df.median)
df['Bolivia']=df['Bolivia'].fillna(df.median)
df['Bosnia and Herzegovina']=df['Bosnia and Herzegovina'].fillna(df.median)

Saving...  (df.median)
median)

df['Brunei']=df['Brunei'].fillna(df.median)
df['Bulgaria']=df['Bulgaria'].fillna(df.median)
df['Burkina Faso']=df['Burkina Faso'].fillna(df.median)
df['Burundi']=df['Burundi'].fillna(df.median)
df['Cambodia']=df['Cambodia'].fillna(df.median)
df['Cameroon']=df['Cameroon'].fillna(df.median)
df['Canada']=df['Canada'].fillna(df.median)
df['Cape Verde']=df['Cape Verde'].fillna(df.median)
df['Central African Republic']=df['Central African Republic'].fillna(df.median)
df['Chad']=df['Chad'].fillna(df.median)
df['Chile']=df['Chile'].fillna(df.median)
```

```
df['Colombia']=df['Colombia'].fillna(df.median)
df['Comoros']=df['Comoros'].fillna(df.median)
df['Congo, Dem. Rep.']=df['Congo, Dem. Rep.'].fillna(df.median)
df['Congo, Rep.']=df['Congo, Rep.'].fillna(df.median)
df['Costa Rica']=df['Costa Rica'].fillna(df.median)
df["Cote d'Ivoire"]=df["Cote d'Ivoire"].fillna(df.median)
df['Croatia']=df['Croatia'].fillna(df.median)
df['Cuba']=df['Cuba'].fillna(df.median)
df['Cyprus']=df['Cyprus'].fillna(df.median)
df['Czech Republic']=df['Czech Republic'].fillna(df.median)
df['Denmark']=df['Denmark'].fillna(df.median)
df['Djibouti']=df['Djibouti'].fillna(df.median)
df['Dominica']=df['Dominica'].fillna(df.median)
df['Dominican Republic']=df['Dominican Republic'].fillna(df.median)
df['Ecuador']=df['Ecuador'].fillna(df.median)
df['Egypt']=df['Egypt'].fillna(df.median)
df['El Salvador']=df['El Salvador'].fillna(df.median)
df['Equatorial Guinea']=df['Equatorial Guinea'].fillna(df.median)
df['Eritrea']=df['Eritrea'].fillna(df.median)
df['Estonia']=df['Estonia'].fillna(df.median)
df['Ethiopia']=df['Ethiopia'].fillna(df.median)
df['Fiji']=df['Fiji'].fillna(df.median)
df['Finland']=df['Finland'].fillna(df.median)
df['France']=df['France'].fillna(df.median)
df['Gabon']=df['Gabon'].fillna(df.median)
df['Gambia']=df['Gambia'].fillna(df.median)
df['Georgia']=df['Georgia'].fillna(df.median)
df['Germany']=df['Germany'].fillna(df.median)
df['Germany']=df['Germany'].fillna(df.median)
df['Ghana']=df['Ghana'].fillna(df.median)
df['Greece']=df['Greece'].fillna(df.median)
df['Grenada']=df['Grenada'].fillna(df.median)
df['Guatemala']=df['Guatemala'].fillna(df.median)
df['Guinea']=df['Guinea'].fillna(df.median)
df['Guinea-Bissau']=df['Guinea-Bissau'].fillna(df.median)
df['Guyana']=df['Guyana'].fillna(df.median)
df['Haiti']=df['Haiti'].fillna(df.median)
df['Honduras']=df['Honduras'].fillna(df.median)
f.median)
Saving... × f.median)
dian)
df['Indonesia']=df['Indonesia'].fillna(df.median)
df['Iran']=df['Iran'].fillna(df.median)
df['Iraq']=df['Iraq'].fillna(df.median)
df['Ireland']=df['Ireland'].fillna(df.median)
df['Israel']=df['Israel'].fillna(df.median)
df['Italy']=df['Italy'].fillna(df.median)
df['Jamaica']=df['Jamaica'].fillna(df.median)
df['Japan']=df['Japan'].fillna(df.median)
df['Jordan']=df['Jordan'].fillna(df.median)
df['Kazakhstan']=df['Kazakhstan'].fillna(df.median)
df['Kenya']=df['Kenya'].fillna(df.median)
```

```
df['Kiribati']=df['Kiribati'].fillna(df.median)
df['Kuwait']=df['Kuwait'].fillna(df.median)
df['Kyrgyz Republic']=df['Kyrgyz Republic'].fillna(df.median)
df['Lao']=df['Lao'].fillna(df.median)
df['Latvia']=df['Latvia'].fillna(df.median)
df['Lebanon']=df['Lebanon'].fillna(df.median)
df['Lesotho']=df['Lesotho'].fillna(df.median)
df['Liberia']=df['Liberia'].fillna(df.median)
df['Libya']=df['Libya'].fillna(df.median)
df['Lithuania']=df['Lithuania'].fillna(df.median)
df['Luxembourg']=df['Luxembourg'].fillna(df.median)
df['Macedonia, FYR']=df['Macedonia, FYR'].fillna(df.median)
df['Madagascar']=df['Madagascar'].fillna(df.median)
df['Malawi']=df['Malawi'].fillna(df.median)
df['Malaysia']=df['Malaysia'].fillna(df.median)
df['Maldives']=df['Maldives'].fillna(df.median)
df['Mali']=df['Mali'].fillna(df.median)
df['Malta']=df['Malta'].fillna(df.median)
df['Marshall Islands']=df['Marshall Islands'].fillna(df.median)
df['Mauritania']=df['Mauritania'].fillna(df.median)
df['Mauritius']=df['Mauritius'].fillna(df.median)
df['Mexico']=df['Mexico'].fillna(df.median)
df['Micronesia, Fed. Sts.']=df['Micronesia, Fed. Sts.'].fillna(df.median)
df['Moldova']=df['Moldova'].fillna(df.median)
df['Mongolia']=df['Mongolia'].fillna(df.median)
df['Montenegro']=df['Montenegro'].fillna(df.median)
df['Morocco']=df['Morocco'].fillna(df.median)
df['Mozambique']=df['Mozambique'].fillna(df.median)
df['Myanmar']=df['Myanmar'].fillna(df.median)
df['Namibia']=df['Namibia'].fillna(df.median)
df['Nauru']=df['Nauru'].fillna(df.median)
df['Nepal']=df['Nepal'].fillna(df.median)
df['Netherlands']=df['Netherlands'].fillna(df.median)
df['New Zealand']=df['New Zealand'].fillna(df.median)
df['Nicaragua']=df['Nicaragua'].fillna(df.median)
df['Niger']=df['Niger'].fillna(df.median)
df['Nigeria']=df['Nigeria'].fillna(df.median)
df['Niger']=df['Niger'].fillna(df.median)

Saving... × median)
an)

df['Pakistan']=df['Pakistan'].fillna(df.median)
df['Palau']=df['Palau'].fillna(df.median)
df['Palestine']=df['Palestine'].fillna(df.median)
df['Panama']=df['Panama'].fillna(df.median)
df['Papua New Guinea']=df['Papua New Guinea'].fillna(df.median)
df['Paraguay']=df['Paraguay'].fillna(df.median)
df['Peru']=df['Peru'].fillna(df.median)
df['Philippines']=df['Philippines'].fillna(df.median)
df['Poland']=df['Poland'].fillna(df.median)
df['Portugal']=df['Portugal'].fillna(df.median)
df['Romania']=df['Romania'].fillna(df.median)
```

```
df['Russia']=df['Russia'].fillna(df.median)
df['Rwanda']=df['Rwanda'].fillna(df.median)
df['Samoa']=df['Samoa'].fillna(df.median)
df['Saudi Arabia']=df['Saudi Arabia'].fillna(df.median)
df['Senegal']=df['Senegal'].fillna(df.median)
df['Serbia']=df['Serbia'].fillna(df.median)
df['Seychelles']=df['Seychelles'].fillna(df.median)
df['Sierra Leone']=df['Sierra Leone'].fillna(df.median)
df['Singapore']=df['Singapore'].fillna(df.median)
df['Slovak Republic']=df['Slovak Republic'].fillna(df.median)
df['Slovenia']=df['Slovenia'].fillna(df.median)
df['Solomon Islands']=df['Solomon Islands'].fillna(df.median)
df['Somalia']=df['Somalia'].fillna(df.median)
df['South Africa']=df['South Africa'].fillna(df.median)
df['South Korea']=df['South Korea'].fillna(df.median)
df['South Sudan']=df['South Sudan'].fillna(df.median)
df['Spain']=df['Spain'].fillna(df.median)
df['Sri Lanka']=df['Sri Lanka'].fillna(df.median)
df['St. Vincent and the Grenadines']=df['St. Vincent and the Grenadines'].fillna(df.median)
df['St. Kitts and Nevis']=df['St. Kitts and Nevis'].fillna(df.median)
df['Sudan']=df['Sudan'].fillna(df.median)
df['Suriname']=df['Suriname'].fillna(df.median)
df['Swaziland']=df['Swaziland'].fillna(df.median)
df['Sweden']=df['Sweden'].fillna(df.median)
df['Switzerland']=df['Switzerland'].fillna(df.median)
df['Syria']=df['Syria'].fillna(df.median)
df['Tajikistan']=df['Tajikistan'].fillna(df.median)
df['Tanzania']=df['Tanzania'].fillna(df.median)
df['Thailand']=df['Thailand'].fillna(df.median)
df['Timor-Leste']=df['Timor-Leste'].fillna(df.median)
df['Togo']=df['Togo'].fillna(df.median)
df['Tonga']=df['Tonga'].fillna(df.median)
df['Tunisia']=df['Tunisia'].fillna(df.median)
df['Turkey']=df['Turkey'].fillna(df.median)
df['Turkmenistan']=df['Turkmenistan'].fillna(df.median)
df['Uganda']=df['Uganda'].fillna(df.median)
df['Ukraine']=df['Ukraine'].fillna(df.median)
df['United Arab Emirates']=df['United Arab Emirates'].fillna(df.median)
df['United Kingdom']=df['United Kingdom'].fillna(df.median)
Saving... × s'].fillna(df.median)
f.median)

df['Uzbekistan']=df['Uzbekistan'].fillna(df.median)
df['Vanuatu']=df['Vanuatu'].fillna(df.median)
df['Venezuela']=df['Venezuela'].fillna(df.median)
df['Vietnam']=df['Vietnam'].fillna(df.median)
df['Yemen']=df['Yemen'].fillna(df.median)
df['Zambia']=df['Zambia'].fillna(df.median)
df['Zimbabwe']=df['Zimbabwe'].fillna(df.median)
```

```
t=pd.to_datetime(df.Year, format='%Y')
```

t

```
0    1960-01-01
1    1961-01-01
2    1962-01-01
3    1963-01-01
4    1964-01-01
5    1965-01-01
6    1966-01-01
7    1967-01-01
8    1968-01-01
9    1969-01-01
10   1970-01-01
11   1971-01-01
12   1972-01-01
13   1973-01-01
14   1974-01-01
15   1975-01-01
16   1976-01-01
17   1977-01-01
18   1978-01-01
19   1979-01-01
20   1980-01-01
21   1981-01-01
22   1982-01-01
23   1983-01-01
24   1984-01-01
25   1985-01-01
26   1986-01-01
27   1987-01-01
28   1988-01-01
29   1989-01-01
30   1990-01-01
31   1991-01-01
32   1992-01-01
33   1993-01-01
34   1994-01-01
35   1995-01-01
36   1996-01-01
37   1997-01-01
38   1998-01-01
39   1999-01-01
40   2000-01-01
```

Saving...



```
45   2005-01-01
44   2004-01-01
45   2005-01-01
46   2006-01-01
47   2007-01-01
48   2008-01-01
49   2009-01-01
50   2010-01-01
51   2011-01-01
52   2012-01-01
53   2013-01-01
54   2014-01-01
```

```
55    2015-01-01
56    2016-01-01
57    2017-01-01
Name: Year, dtype: datetime64[ns]
```

```
pivott = df.pivot_table(index=[t], values=['Afghanistan'], aggfunc=[np.median], fill_value=0, ma  
pivott
```

Saving... X

median
Afghanistan

Year	median
1960-01-01	4.13
1961-01-01	4.45
1962-01-01	4.88
1963-01-01	9.17
1964-01-01	8.89
1965-01-01	11.30
1966-01-01	8.57
1967-01-01	6.77
1968-01-01	8.90
1969-01-01	10.10
1970-01-01	9.78
1971-01-01	10.90
1972-01-01	14.80
1973-01-01	12.90
1974-01-01	14.00
1975-01-01	12.70
1976-01-01	13.20
1977-01-01	11.70
1978-01-01	10.80
1979-01-01	0.00

Saving...



1982-01-01	0.00
1983-01-01	0.00
1984-01-01	0.00
1985-01-01	0.00
1986-01-01	0.00
1987-01-01	0.00

```
1988-01-01          0.00
```

```
y = pivott.resample('MS').mean()
y
```

```
median
Afghanistan
```

Year

1960-01-01	4.13
1960-02-01	NaN
1960-03-01	NaN
1960-04-01	NaN
1960-05-01	NaN
...	...
2016-09-01	NaN
2016-10-01	NaN
2016-11-01	NaN
2016-12-01	NaN
2017-01-01	0.00

685 rows × 1 columns $\angle 1.40$

```
y = y.replace('nan', np.nan).fillna(y.median())
```

```
2007-01-01          17.00
```

```
y.isnull().sum()
```

```
median    Afghanistan      0
dtype: int64
```

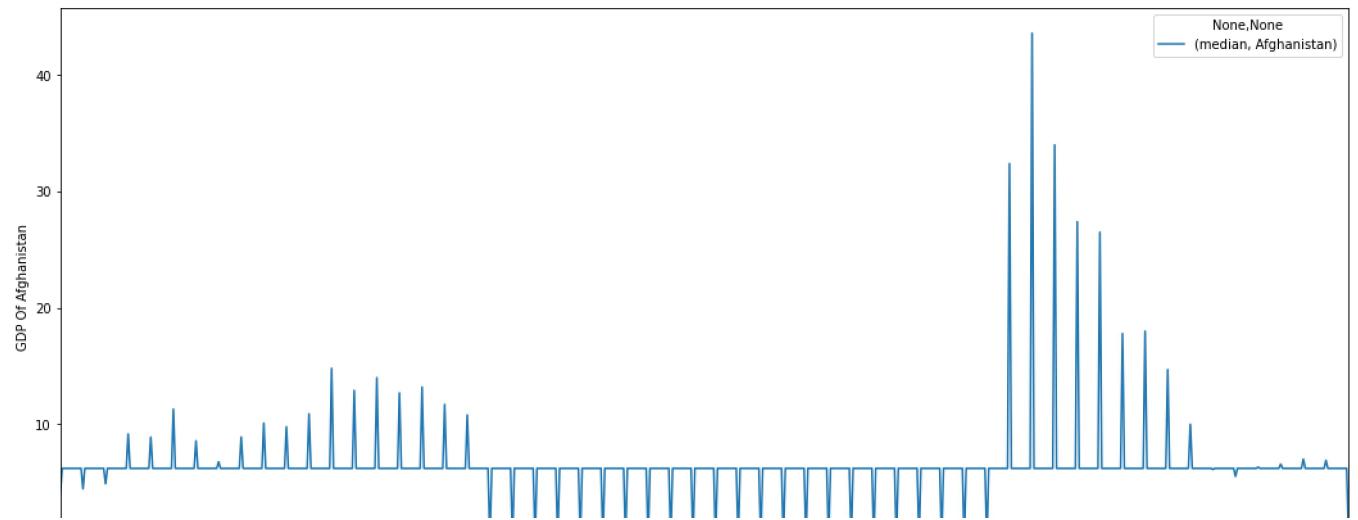
```
2010-01-01          10.00
```

```
y.plot(xlabel="Years", ylabel="GDP Of Afghanistan")
```

Saving...

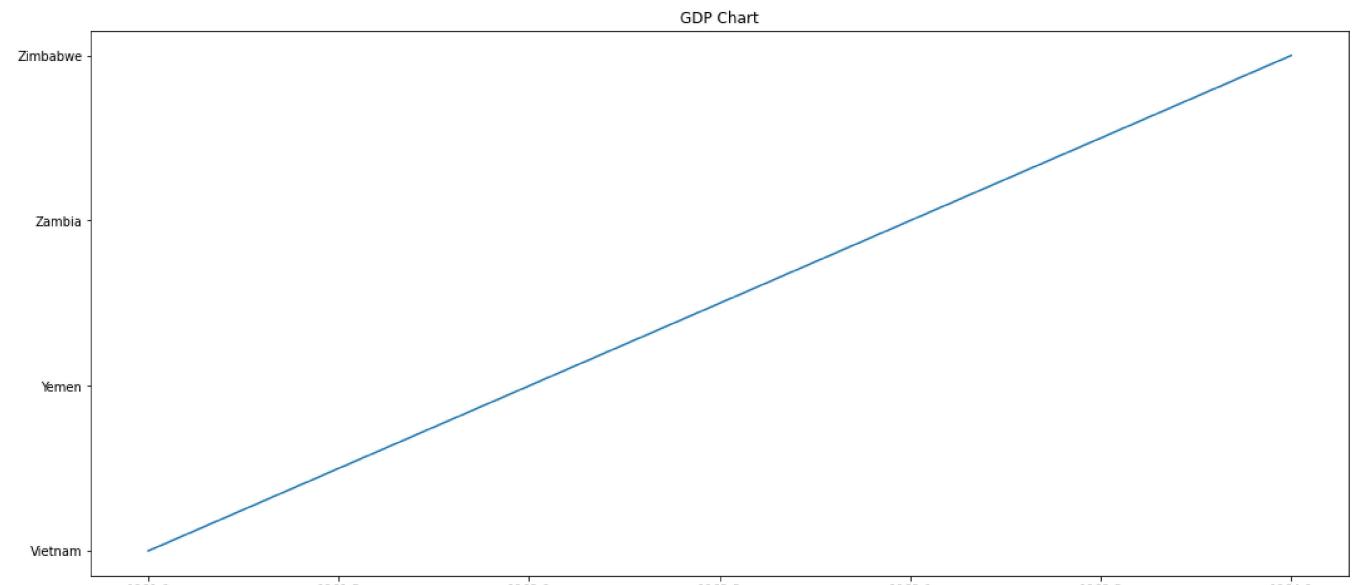


```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7aef4ac9e8>
```



This is the actual graphical representation of GDP Of Afghanistan.

```
plt.plot([1961,1962, 1963, 1964],[ 'Vietnam','Yemen','Zambia','Zimbabwe'])  
plt.title('GDP Chart')  
plt.show()
```



Saving... X

This is absolutely wrong way of interpretation of this data. Here, year v/s country is taken without

```
country=[ 'Vietnam', 'Yemen', 'Zambia', 'Zimbabwe' ]
```

```
year = [1961,1962, 1963, 1964]
```

```
# Figure Size
```

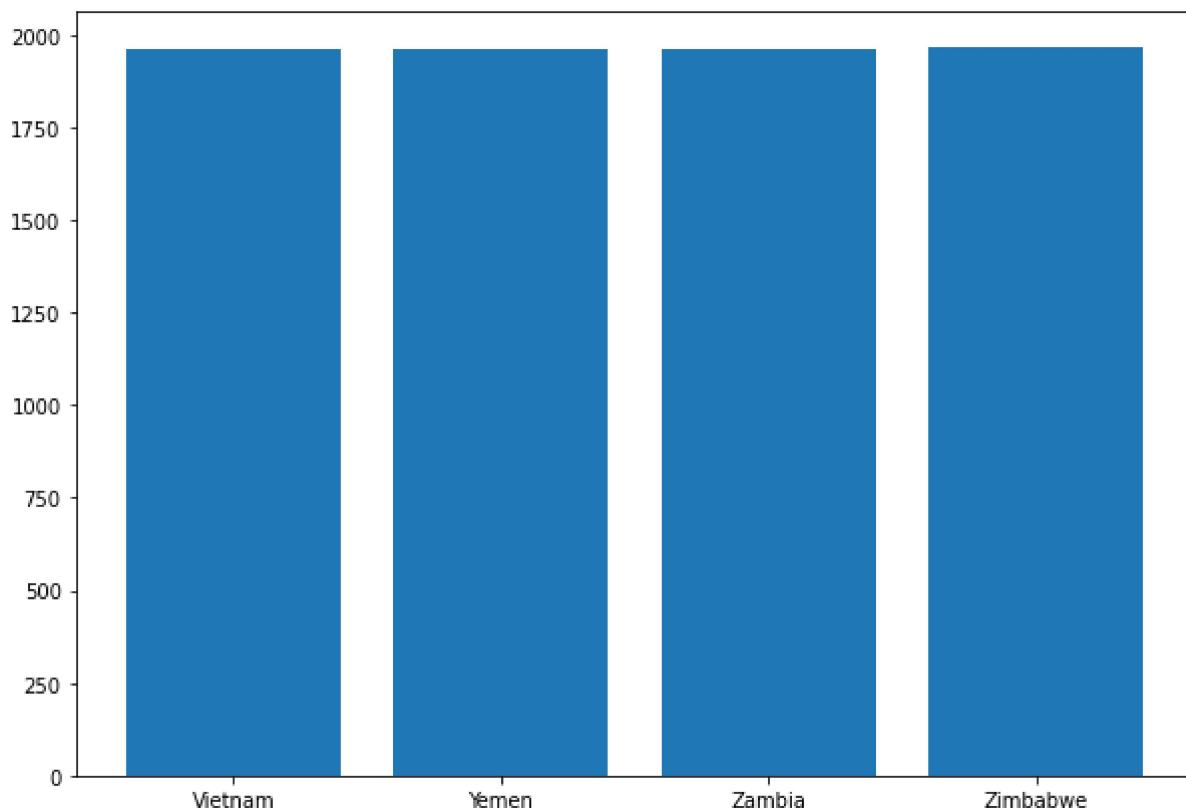
```
fig = plt.figure(figsize =(10, 7))
```

```
# Horizontal Bar Plot
```

```
plt.bar(country, year)
```

```
# Show Plot
```

```
plt.show()
```



Saving...

bar charts.

Time Series Of North-American Countries.

```
r=pd.to_datetime(df.Year, format='%Y')
```

```
r
```

0	1960-01-01
1	1961-01-01
2	1962-01-01
3	1963-01-01

```
4    1964-01-01
5    1965-01-01
6    1966-01-01
7    1967-01-01
8    1968-01-01
9    1969-01-01
10   1970-01-01
11   1971-01-01
12   1972-01-01
13   1973-01-01
14   1974-01-01
15   1975-01-01
16   1976-01-01
17   1977-01-01
18   1978-01-01
19   1979-01-01
20   1980-01-01
21   1981-01-01
22   1982-01-01
23   1983-01-01
24   1984-01-01
25   1985-01-01
26   1986-01-01
27   1987-01-01
28   1988-01-01
29   1989-01-01
30   1990-01-01
31   1991-01-01
32   1992-01-01
33   1993-01-01
34   1994-01-01
35   1995-01-01
36   1996-01-01
37   1997-01-01
38   1998-01-01
39   1999-01-01
40   2000-01-01
41   2001-01-01
42   2002-01-01
43   2003-01-01
44   2004-01-01
45   2005-01-01
46   2006-01-01
```

Saving...



```
49   2009-01-01
50   2010-01-01
51   2011-01-01
52   2012-01-01
53   2013-01-01
54   2014-01-01
55   2015-01-01
56   2016-01-01
57   2017-01-01
```

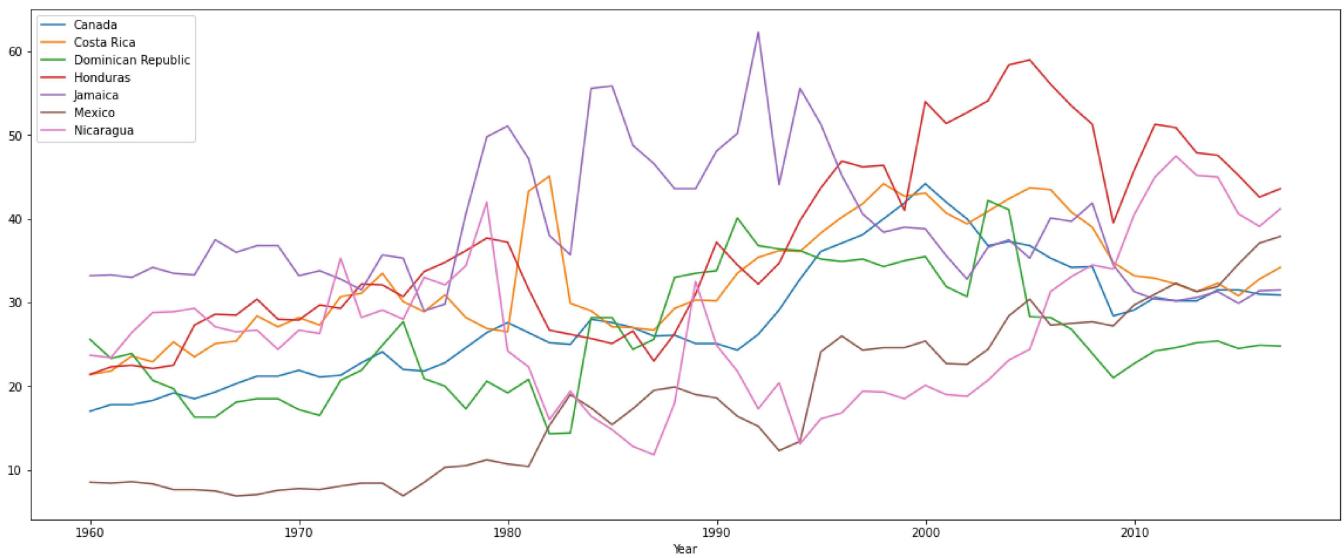
Name: Year, dtype: datetime64[ns]

able

```
table.isna().sum()
```

```
Canada          0
Costa Rica      0
Dominican Republic 0
Honduras         0
Jamaica          0
Mexico           0
Nicaragua         0
dtype: int64
```

```
table.plot(figsize=(20, 8))
plt.show()
```



Saving...

```
r=pd.to_datetime(df.Year, format='%Y')
r
```

```
0    1960-01-01
1    1961-01-01
2    1962-01-01
```

```
3    1963-01-01
4    1964-01-01
5    1965-01-01
6    1966-01-01
7    1967-01-01
8    1968-01-01
9    1969-01-01
10   1970-01-01
11   1971-01-01
12   1972-01-01
13   1973-01-01
14   1974-01-01
15   1975-01-01
16   1976-01-01
17   1977-01-01
18   1978-01-01
19   1979-01-01
20   1980-01-01
21   1981-01-01
22   1982-01-01
23   1983-01-01
24   1984-01-01
25   1985-01-01
26   1986-01-01
27   1987-01-01
28   1988-01-01
29   1989-01-01
30   1990-01-01
31   1991-01-01
32   1992-01-01
33   1993-01-01
34   1994-01-01
35   1995-01-01
36   1996-01-01
37   1997-01-01
38   1998-01-01
39   1999-01-01
40   2000-01-01
41   2001-01-01
42   2002-01-01
43   2003-01-01
44   2004-01-01
45   2005-01-01
```

Saving...



```
46   2006-01-01
47   2007-01-01
48   2008-01-01
49   2009-01-01
50   2010-01-01
51   2011-01-01
52   2012-01-01
53   2013-01-01
54   2014-01-01
55   2015-01-01
56   2016-01-01
57   2017-01-01
```

Name: Year, dtype: datetime64[ns]

```
#pivot table is created.  
pivot = df.pivot_table(index=[r], values=['Antigua and Barbuda','Bahamas','Barbados','Belize'  
  
pivot
```

Saving... X

	median						
	Canada	Costa Rica	Dominican Republic	Honduras	Jamaica	Mexico	Nicaragua
Year							
1960-01-01	17.0	21.4	25.6	21.4	33.2	8.51	23.7
1961-01-01	17.8	21.8	23.3	22.3	33.3	8.41	23.4
1962-01-01	17.8	23.6	23.9	22.5	33.0	8.57	26.4
1963-01-01	18.3	22.9	20.7	22.1	34.2	8.32	28.8
1964-01-01	19.2	25.3	19.7	22.5	33.5	7.63	28.9
1965-01-01	18.5	23.5	16.3	27.3	33.3	7.63	29.3
1966-01-01	19.3	25.1	16.3	28.6	37.5	7.47	27.1
1967-01-01	20.3	25.4	18.1	28.5	36.0	6.87	26.5
1968-01-01	21.2	28.4	18.5	30.4	36.8	7.04	26.7
1969-01-01	21.2	27.1	18.5	28.0	36.8	7.55	24.4
1970-01-01	21.9	28.2	17.2	27.9	33.2	7.75	26.7
1971-01-01	21.1	27.3	16.5	29.7	33.8	7.64	26.3
1972-01-01	21.3	30.7	20.7	29.3	32.8	8.06	35.3
Saving...		X					
1973-01-01			21.9	32.2	31.5	8.41	28.2
1974-01-01	24.1	33.5	24.9	32.1	35.7	8.41	29.1
1975-01-01	22.0	30.1	27.7	30.7	35.3	6.89	28.0
1976-01-01	21.8	28.9	20.9	33.7	29.0	8.49	33.0

```
y = pivot.resample('MS').mean()
y
```

	median							
	Canada	Costa Rica	Dominican Republic	Honduras	Jamaica	Mexico	Nicaragua	
Year								
1960-01-01	17.0	21.4		25.6	21.4	33.2	8.51	23.7
1960-02-01	NaN	NaN		NaN	NaN	NaN	NaN	NaN
1960-03-01	NaN	NaN		NaN	NaN	NaN	NaN	NaN
1960-04-01	NaN	NaN		NaN	NaN	NaN	NaN	NaN
1960-05-01	NaN	NaN		NaN	NaN	NaN	NaN	NaN
...
2016-09-01	NaN	NaN		NaN	NaN	NaN	NaN	NaN
2016-10-01	25.0	25.0		25.0	25.0	25.0	25.0	25.0

```
y.isna().sum()
```

median	Canada	0
	Costa Rica	0
	Dominican Republic	0
	Honduras	0
	Jamaica	0
	Mexico	0
	Nicaragua	0

dtype: int64

```
..
```

```
y = y.replace('nan', np.nan).fillna(y.median())
```

Saving...



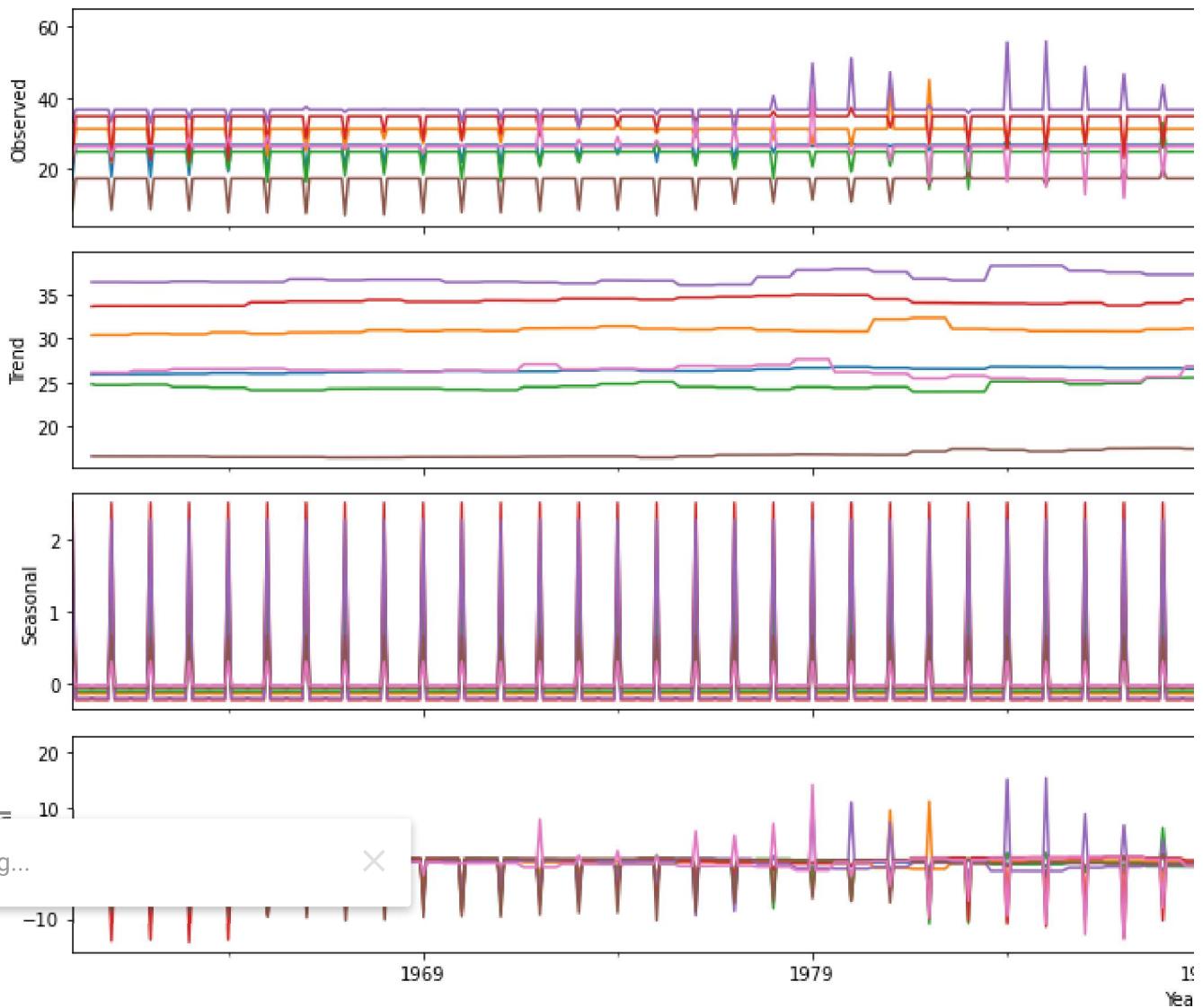
North American Countries")

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7b04bab940>
```



```
import statsmodels.api as sm
from pylab import rcParams
rcParams['figure.figsize'] = 18, 8
decomposition = sm.tsa.seasonal_decompose(y, model='additive')
fig = decomposition.plot()
plt.show()
```

```
/usr/local/lib/python3.6/dist-packages/statsmodels/tools/_testing.py:19: FutureWarning:
  import pandas.util.testing as tm
```

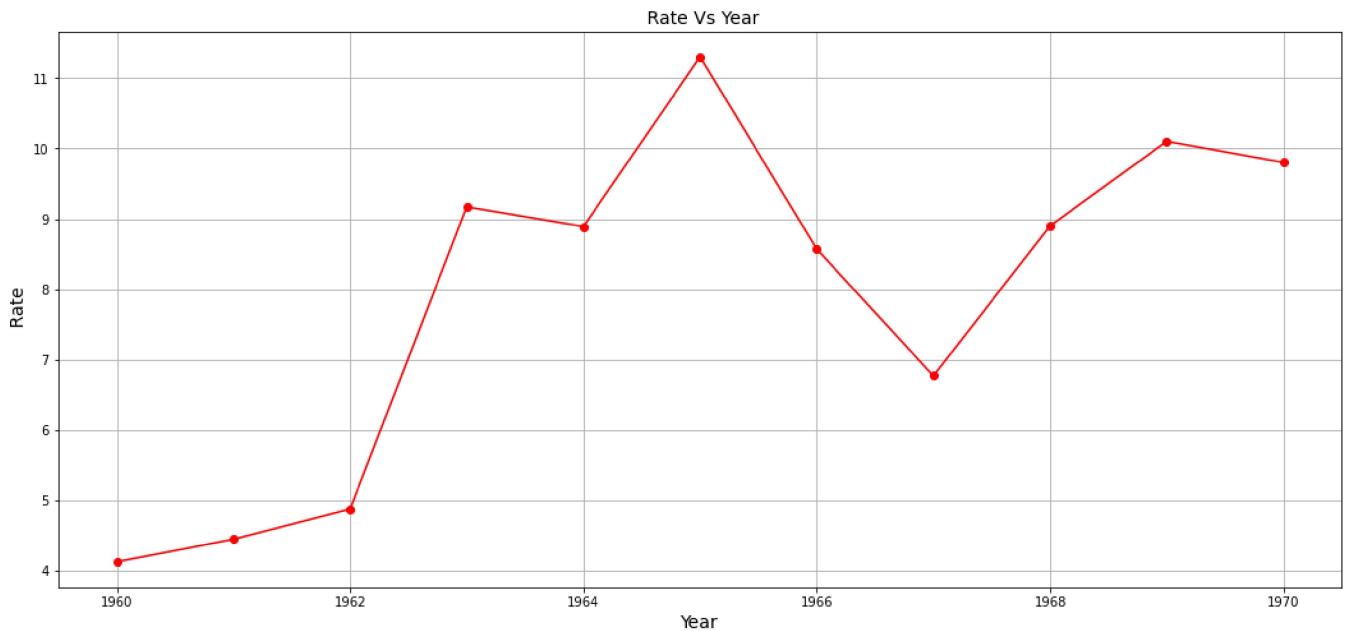


The above shown graphs, is useful for the correct prediction for the time series analysis.

```
Data = {'Year': [1960,1961,1962,1963,1964,1965,1966,1967,1968,1969,1970],
        'Rate': [4.13,4.45,4.88,9.17,8.89,11.3,8.57,6.77,8.9,10.1,9.8]
       }
```

```
df = pd.DataFrame(Data,columns=['Year','Rate'])

plt.plot(df['Year'], df['Rate'], color='red', marker='o')
plt.title(' Rate Vs Year', fontsize=14)
plt.xlabel('Year', fontsize=14)
plt.ylabel(' Rate', fontsize=14)
plt.grid(True)
plt.show()
```

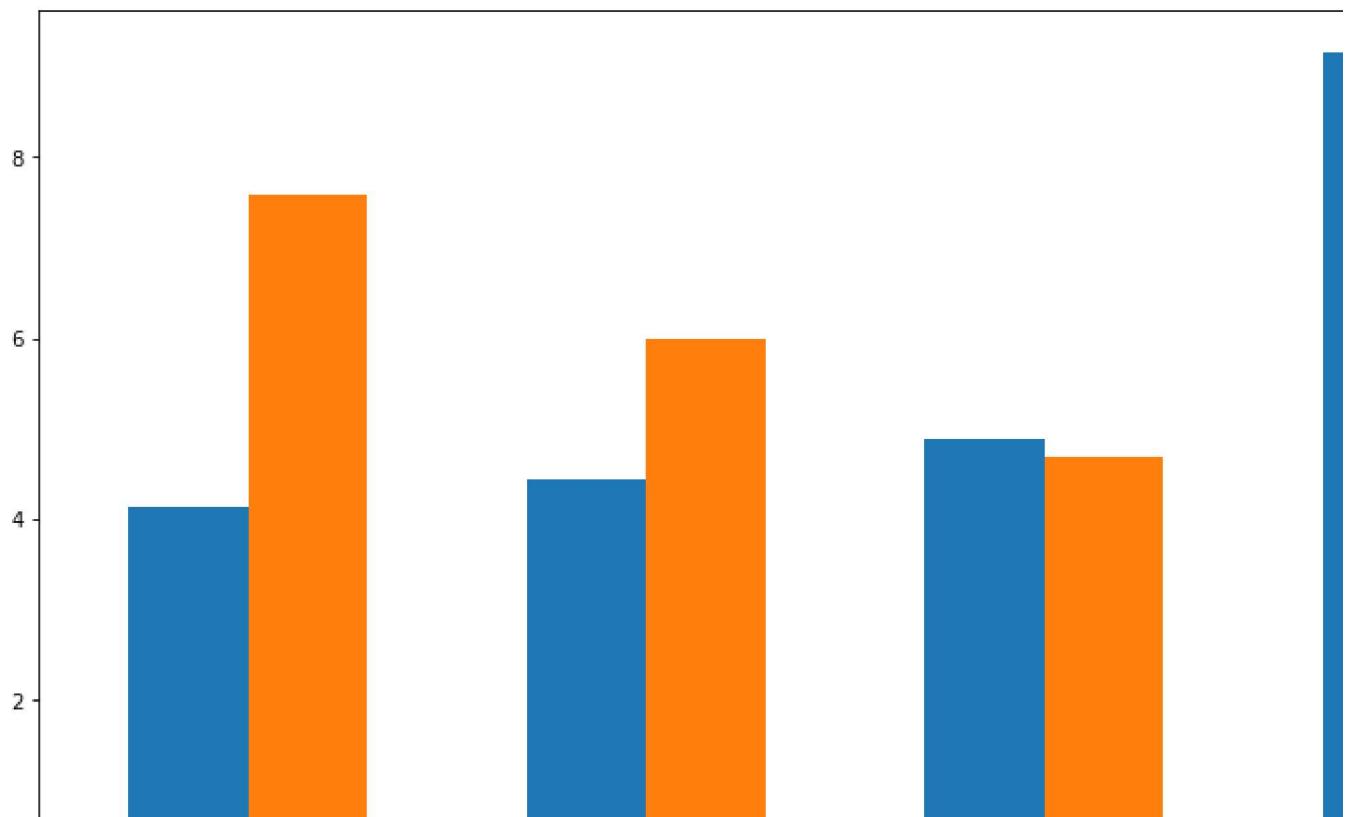


Saving...



When comparing two data series, a line chart is advisable.

```
data1 = [4.13,4.45,4.88,9.17,8.89]
data2 = [7.6,5.99,4.69,7.89,5.56]
width =0.3
plt.bar(np.arange(len(data1)), data1, width=width)
plt.bar(np.arange(len(data2))+ width, data2, width=width)
plt.show()
```



If two countries are taken into instance, Stacked Chart is the best option. Here, data1 is GDP of Afghanistan and data2 is GDP of Argentina for years 1960-1965.

Saving...

