

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

import warnings
warnings.filterwarnings('ignore')
```

```
In [2]: df1 = pd.read_excel('Carbon Emission Dataset.xls')
```

```
In [3]: df1.head()
```

Out[3]:

	Country Name	Country Code	Indicator Name	Indicator Code	1990	1991	1992	1993
0	Afghanistan	AFG	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.222538	0.207535	0.115282	0.095689
1	Africa Eastern and Southern	AFE	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.982136	0.937815	0.902599	0.904581
2	Africa Western and Central	AFW	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.473669	0.525418	0.563118	0.518770
3	Albania	ALB	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	1.819542	1.242810	0.683700	0.638307
4	Algeria	DZA	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	2.466487	2.541909	2.498850	2.640167

5 rows × 37 columns



```
In [4]: df1.shape
```

Out[4]: (268, 37)

```
In [5]: df2 = pd.read_excel('Carbon Emission Dataset.xls', sheet_name = 1)
```

In [6]: df2.head()

Out[6]:

	Country Code	Region	IncomeGroup	SpecialNotes	TableName
0	ABW	Latin America & Caribbean	High income	NaN	Aruba
1	AFE	NAN	NAN	26 countries, stretching from the Red Sea in t...	Africa Eastern and Southern
2	AFG	South Asia	Low income	The reporting period for national accounts dat...	Afghanistan
3	AFW	NAN	NAN	22 countries, stretching from the westernmost ...	Africa Western and Central
4	AGO	Sub-Saharan Africa	Lower middle income	The World Bank systematically assesses the app...	Angola

In [7]: df2.shape

Out[7]: (265, 5)

In [8]: df1[df1['Country Code'].duplicated()]

Out[8]:

	Country Name	Country Code	Indicator Name	Indicator Code	1990	1991	1992	1993
203	USSR	RUS	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	14.621468	14.397057	13.671972	12.665132
204	United States of Soviet Russia	RUS	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	14.621468	14.397057	13.671972	12.665132

2 rows × 37 columns



In [9]: df1[df1['Country Name'].duplicated()]

Out[9]:

Country Name	Country Code	Indicator Name	Indicator Code	1990	1991	1992	1993	1994	1995	...	2012	2013	2
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0 rows × 37 columns



In [10]: df2.drop(columns = 'SpecialNotes', inplace = True)

In [11]: df2.head()

Out[11]:

	Country Code	Region	IncomeGroup	TableName
0	ABW	Latin America & Caribbean	High income	Aruba
1	AFE	NaN	NaN	Africa Eastern and Southern
2	AFG	South Asia	Low income	Afghanistan
3	AFW	NaN	NaN	Africa Western and Central
4	AGO	Sub-Saharan Africa	Lower middle income	Angola

In [12]: df = pd.merge(df1, df2, on = 'Country Code', how = 'inner')

In [13]: df.head()

Out[13]:

	Country Name	Country Code	Indicator Name	Indicator Code	1990	1991	1992	1993
0	Afghanistan	AFG	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.222538	0.207535	0.115282	0.095689
1	Africa Eastern and Southern	AFE	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.982136	0.937815	0.902599	0.904581
2	Africa Western and Central	AFW	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.473669	0.525418	0.563118	0.518770
3	Albania	ALB	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	1.819542	1.242810	0.683700	0.638307
4	Algeria	DZA	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	2.466487	2.541909	2.498850	2.640167

5 rows × 40 columns



In [14]: df.shape

Out[14]: (267, 40)

In [15]: df.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 267 entries, 0 to 266
Data columns (total 40 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Country Name    267 non-null    object  
 1   Country Code    267 non-null    object  
 2   Indicator Name  267 non-null    object  
 3   Indicator Code  267 non-null    object  
 4   1990             235 non-null    float64 
 5   1991             236 non-null    float64 
 6   1992             240 non-null    float64 
 7   1993             240 non-null    float64 
 8   1994             242 non-null    float64 
 9   1995             241 non-null    float64 
 10  1996             241 non-null    float64 
 11  1996.1          241 non-null    float64 
 12  1997             240 non-null    float64 
 13  1998             239 non-null    float64 
 14  1999             239 non-null    float64 
 15  2000             240 non-null    float64 
 16  2001             240 non-null    float64 
 17  2002             241 non-null    float64 
 18  2003             241 non-null    float64 
 19  2004             241 non-null    float64 
 20  2005             241 non-null    float64 
 21  2006             241 non-null    float64 
 22  2007             241 non-null    float64 
 23  2008             241 non-null    float64 
 24  2009             241 non-null    float64 
 25  2010             241 non-null    float64 
 26  2011             241 non-null    float64 
 27  2012             241 non-null    float64 
 28  2013             241 non-null    float64 
 29  2014             240 non-null    float64 
 30  2015             241 non-null    float64 
 31  2016             238 non-null    float64 
 32  2017             238 non-null    float64 
 33  2018             236 non-null    float64 
 34  2019             241 non-null    float64 
 35  2020             0 non-null     float64 
 36  2021             0 non-null     float64 
 37  Region           219 non-null    object  
 38  IncomeGroup      218 non-null    object  
 39  TableName        267 non-null    object  
dtypes: float64(33), object(7)
memory usage: 83.6+ KB
```

In [16]: df.columns

```
Out[16]: Index(['Country Name', 'Country Code', 'Indicator Name', 'Indicator Code',
       '1990', '1991', '1992', '1993', '1994', '1995', '1996', '1996.1',
       '1997', '1998', '1999', '2000', '2001', '2002', '2003', '2004', '200
      5',
       '2006', '2007', '2008', '2009', '2010', '2011', '2012', '2013', '201
      4',
       '2015', '2016', '2017', '2018', '2019', '2020', '2021', 'Region',
       'IncomeGroup', 'TableName'],
      dtype='object')
```

In [17]: df.columns = df.columns.str.strip().str.lower()

In [18]: df.columns

```
Out[18]: Index(['country name', 'country code', 'indicator name', 'indicator code',
       '1990', '1991', '1992', '1993', '1994', '1995', '1996', '1996.1',
       '1997', '1998', '1999', '2000', '2001', '2002', '2003', '2004', '200
      5',
       '2006', '2007', '2008', '2009', '2010', '2011', '2012', '2013', '201
      4',
       '2015', '2016', '2017', '2018', '2019', '2020', '2021', 'region',
       'incomegroup', 'tablename'],
      dtype='object')
```

In [19]: df.duplicated().sum()

Out[19]: 0

In [20]: df[df['country code'].duplicated()]

Out[20]:

	country name	country code	indicator name	indicator code	1990	1991	1992	1993
202	USSR	RUS	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	14.621468	14.397057	13.671972	12.665132
203	United States of Soviet Russia	RUS	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	14.621468	14.397057	13.671972	12.665132

2 rows × 40 columns

In [21]: df.drop_duplicates('country code', inplace = True)

In [22]: `df[df['country code'].duplicated()]`

Out[22]:

country name	country code	indicator name	indicator code	1990	1991	1992	1993	1994	1995	...	2015	2016	2017
-----------------	-----------------	-------------------	-------------------	------	------	------	------	------	------	-----	------	------	------

0 rows × 14 columns



In [23]: `df.shape`

Out[23]: (265, 40)

In [24]: `df.describe()`

Out[24]:

	1990	1991	1992	1993	1994	1995	1996
count	233.000000	234.000000	238.000000	238.000000	240.000000	239.000000	239.000000
mean	4.260000	4.151660	4.080692	4.016449	328.530774	320.016011	326.679460
std	5.342026	5.301009	5.124561	5.172167	3409.133426	3291.136718	3379.575620
min	0.001118	0.001096	0.001074	0.001052	0.000000	0.000000	0.000000
25%	0.484838	0.510810	0.545303	0.523340	0.545490	0.583324	0.586720
50%	2.034013	2.018620	2.041855	2.041584	2.059924	2.145023	2.208230
75%	6.750086	6.459306	6.388723	6.373927	6.726503	6.610071	6.902800
max	29.566584	32.815902	31.148351	34.174072	50790.380254	48798.885480	50008.097860

8 rows × 33 columns



```
In [25]: df.isnull().sum()
```

```
Out[25]: country name      0  
country code       0  
indicator name     0  
indicator code     0  
1990                32  
1991                31  
1992                27  
1993                27  
1994                25  
1995                26  
1996                26  
1996.1               26  
1997                27  
1998                28  
1999                28  
2000                27  
2001                27  
2002                26  
2003                26  
2004                26  
2005                26  
2006                26  
2007                26  
2008                26  
2009                26  
2010                26  
2011                26  
2012                26  
2013                26  
2014                27  
2015                26  
2016                29  
2017                29  
2018                31  
2019                26  
2020                265  
2021                265  
region               48  
incomegroup          49  
tablename            0  
dtype: int64
```

In [26]: `round(df.isnull().sum()*100/df.shape[0], 2).astype(str) + '%'`

Out[26]:

country name	0.0%
country code	0.0%
indicator name	0.0%
indicator code	0.0%
1990	12.08%
1991	11.7%
1992	10.19%
1993	10.19%
1994	9.43%
1995	9.81%
1996	9.81%
1996.1	9.81%
1997	10.19%
1998	10.57%
1999	10.57%
2000	10.19%
2001	10.19%
2002	9.81%
2003	9.81%
2004	9.81%
2005	9.81%
2006	9.81%
2007	9.81%
2008	9.81%
2009	9.81%
2010	9.81%
2011	9.81%
2012	9.81%
2013	9.81%
2014	10.19%
2015	9.81%
2016	10.94%
2017	10.94%
2018	11.7%
2019	9.81%
2020	100.0%
2021	100.0%
region	18.11%
incomegroup	18.49%
tablename	0.0%
dtype:	object

In [27]: `df['region'].nunique()`

Out[27]: 7

In [28]: `df['region'].fillna('Unknown', inplace = True)`

In [29]: `df['incomegroup'].fillna('Unknown', inplace = True)`

In [30]: `df['2020'].value_counts()`

Out[30]: Series([], Name: count, dtype: int64)

```
In [31]: df['2021'].value_counts()
```

```
Out[31]: Series([], Name: count, dtype: int64)
```

```
In [32]: df.drop(columns = ['1996.1', '2020', '2021'], inplace = True)
```

```
In [33]: cat = []
num = []

for i in df.columns:
    if df[i].dtype == 'object':
        cat.append(i)
    else:
        num.append(i)
```

```
In [34]: cat
```

```
Out[34]: ['country name',
          'country code',
          'indicator name',
          'indicator code',
          'region',
          'incomegroup',
          'tablename']
```

```
In [35]: num
```

```
Out[35]: ['1990',
          '1991',
          '1992',
          '1993',
          '1994',
          '1995',
          '1996',
          '1997',
          '1998',
          '1999',
          '2000',
          '2001',
          '2002',
          '2003',
          '2004',
          '2005',
          '2006',
          '2007',
          '2008',
          '2009',
          '2010',
          '2011',
          '2012',
          '2013',
          '2014',
          '2015',
          '2016',
          '2017',
          '2018',
          '2019']
```

```
In [36]: for i in num:  
    df[i].fillna(0, inplace = True)
```

```
In [37]: df.isnull().sum()
```

```
Out[37]: country name      0  
country code       0  
indicator name     0  
indicator code     0  
1990                 0  
1991                 0  
1992                 0  
1993                 0  
1994                 0  
1995                 0  
1996                 0  
1997                 0  
1998                 0  
1999                 0  
2000                 0  
2001                 0  
2002                 0  
2003                 0  
2004                 0  
2005                 0  
2006                 0  
2007                 0  
2008                 0  
2009                 0  
2010                 0  
2011                 0  
2012                 0  
2013                 0  
2014                 0  
2015                 0  
2016                 0  
2017                 0  
2018                 0  
2019                 0  
region                0  
incomegroup           0  
tablename             0  
dtype: int64
```

```
In [38]: new_df = df
```

```
In [39]: new_df['total emission'] = 0

for i in num:
    new_df['total emission'] = new_df['total emission'] + new_df[i]

new_df.head()
```

Out[39]:

	country name	country code	indicator name	indicator code	1990	1991	1992	1993
0	Afghanistan	AFG	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.222538	0.207535	0.115282	0.095689
1	Africa Eastern and Southern	AFE	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.982136	0.937815	0.902599	0.904581
2	Africa Western and Central	AFW	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.473669	0.525418	0.563118	0.518770
3	Albania	ALB	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	1.819542	1.242810	0.683700	0.638307
4	Algeria	DZA	CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	2.466487	2.541909	2.498850	2.640167

5 rows × 38 columns



Univariate Analysis

```
In [40]: for i in cat:  
    print(f'Values count in {i} is : {df[i].value_counts()}')  
    print()
```

Values count in country name is : country name

Afghanistan	1
Norway	1
Mozambique	1
Myanmar	1
Namibia	1
..	
Guam	1
Guatemala	1
Guinea	1
Guinea-Bissau	1
Zimbabwe	1

Name: count, Length: 265, dtype: int64

Values count in country code is : country code

AFG	1
NOR	1
MOZ	1
MMR	1
NAM	1
..	
GUM	1
GTM	1
GIN	1
GNB	1
ZWE	1

Name: count, Length: 265, dtype: int64

Values count in indicator name is : indicator name

CO2 emissions (metric tons per capita) 265

Name: count, dtype: int64

Values count in indicator code is : indicator code

EN.ATM.CO2E.PC	265
Name: count, dtype: int64	

Values count in region is : region

Europe & Central Asia	58
Unknown	48
Sub-Saharan Africa	48
Latin America & Caribbean	42
East Asia & Pacific	37
Middle East & North Africa	21
South Asia	8
North America	3

Name: count, dtype: int64

Values count in incomegroup is : incomegroup

High income	80
Upper middle income	54
Lower middle income	54
Unknown	49
Low income	28

Name: count, dtype: int64

Values count in tablename is : tablename

Afghanistan	1
Norway	1
Mozambique	1
Myanmar	1
Namibia	1

```
..  
Guam          1  
Guatemala    1  
Guinea        1  
Guinea-Bissau 1  
Zimbabwe      1  
Name: count, Length: 265, dtype: int64
```

```
In [41]: for i in cat:  
    print(f'Mode of {i} is : {df[i].mode()[0]}')  
    print()
```

```
Mode of country name is : Afghanistan  
Mode of country code is : ABW  
Mode of indicator name is : CO2 emissions (metric tons per capita)  
Mode of indicator code is : EN.ATM.CO2E.PC  
Mode of region is : Europe & Central Asia  
Mode of incomegroup is : High income  
Mode of tablename is : Afghanistan
```

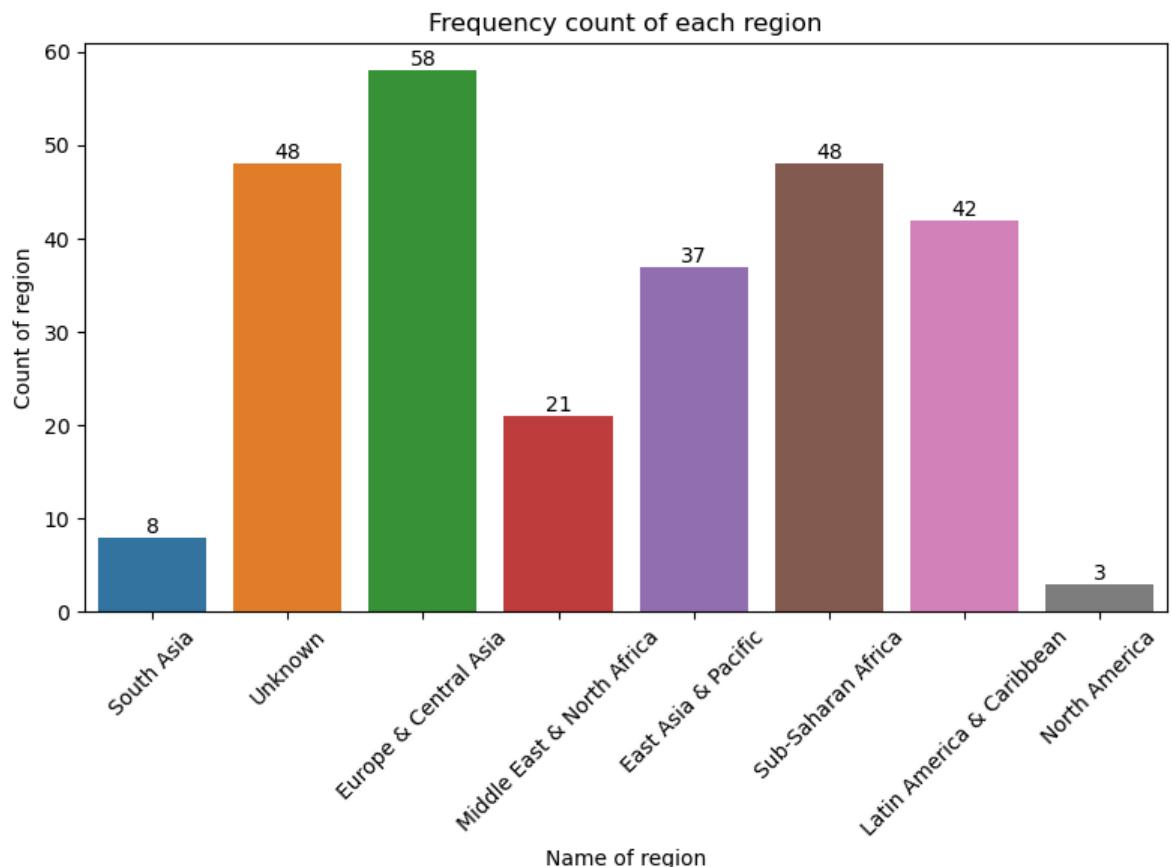
```
In [42]: for i in cat:  
    print(f'Number of Unique values in {i} is : {df[i].nunique()}')  
    print()
```

```
Number of Unique values in country name is : 265  
Number of Unique values in country code is : 265  
Number of Unique values in indicator name is : 1  
Number of Unique values in indicator code is : 1  
Number of Unique values in region is : 8  
Number of Unique values in incomegroup is : 5  
Number of Unique values in tablename is : 265
```

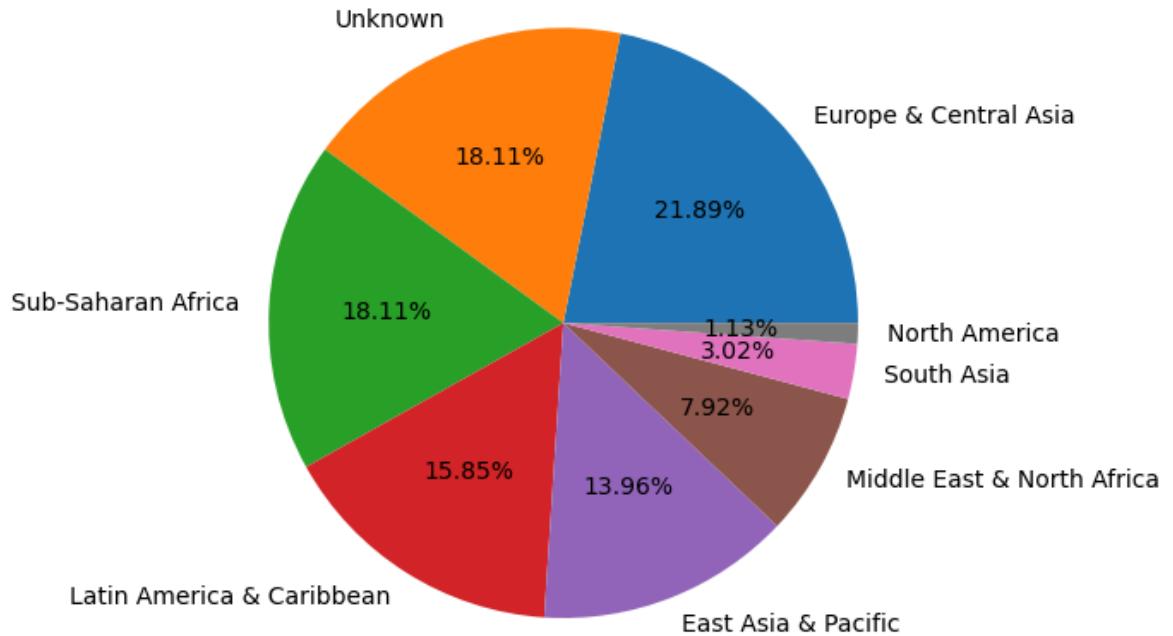
```
In [43]: cat.remove('country name')  
cat.remove('country code')  
cat.remove('indicator name')  
cat.remove('indicator code')  
cat.remove('tablename')
```

```
In [44]: for i in cat:
    plt.figure(figsize = (8,6))
    ax = sns.countplot(x = i, data = df)
    ax.bar_label(ax.containers[0])
    plt.title(f'Frequency count of each {i}')
    plt.xlabel(f'Name of {i}')
    plt.ylabel(f'Count of {i}')
    plt.xticks(rotation = 45)
    plt.tight_layout()
    plt.show()

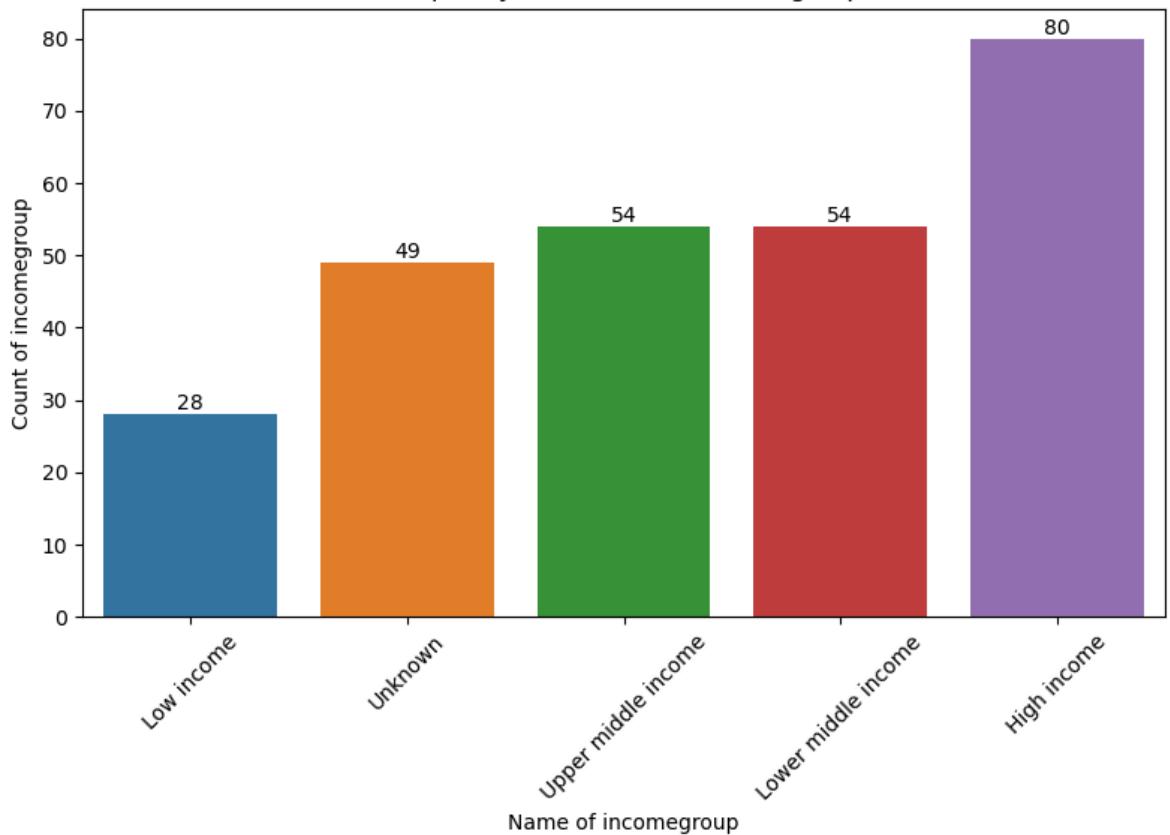
    var = df[i].value_counts()
    plt.pie(var, labels = var.index, autopct = '%0.2f%%')
    plt.title(f'Percentage distribution of {i}')
    plt.tight_layout()
    plt.show()
```



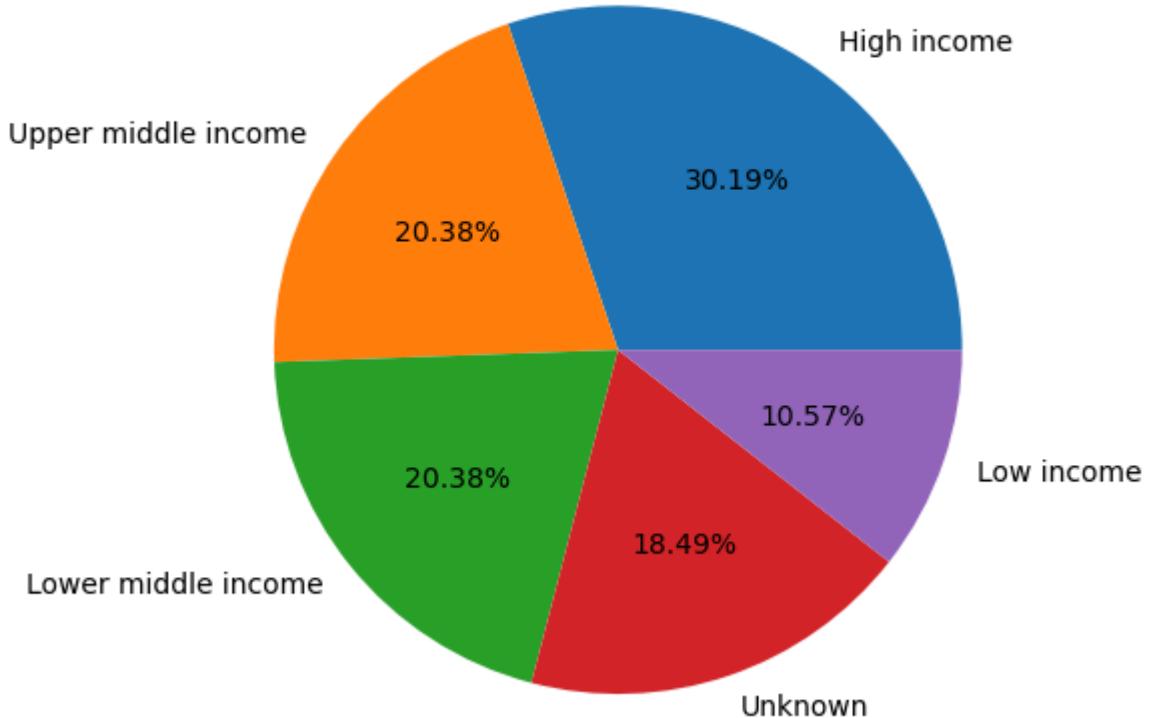
Percentage distribution of region



Frequency count of each incomegroup



Percentage distribution of incomegroup

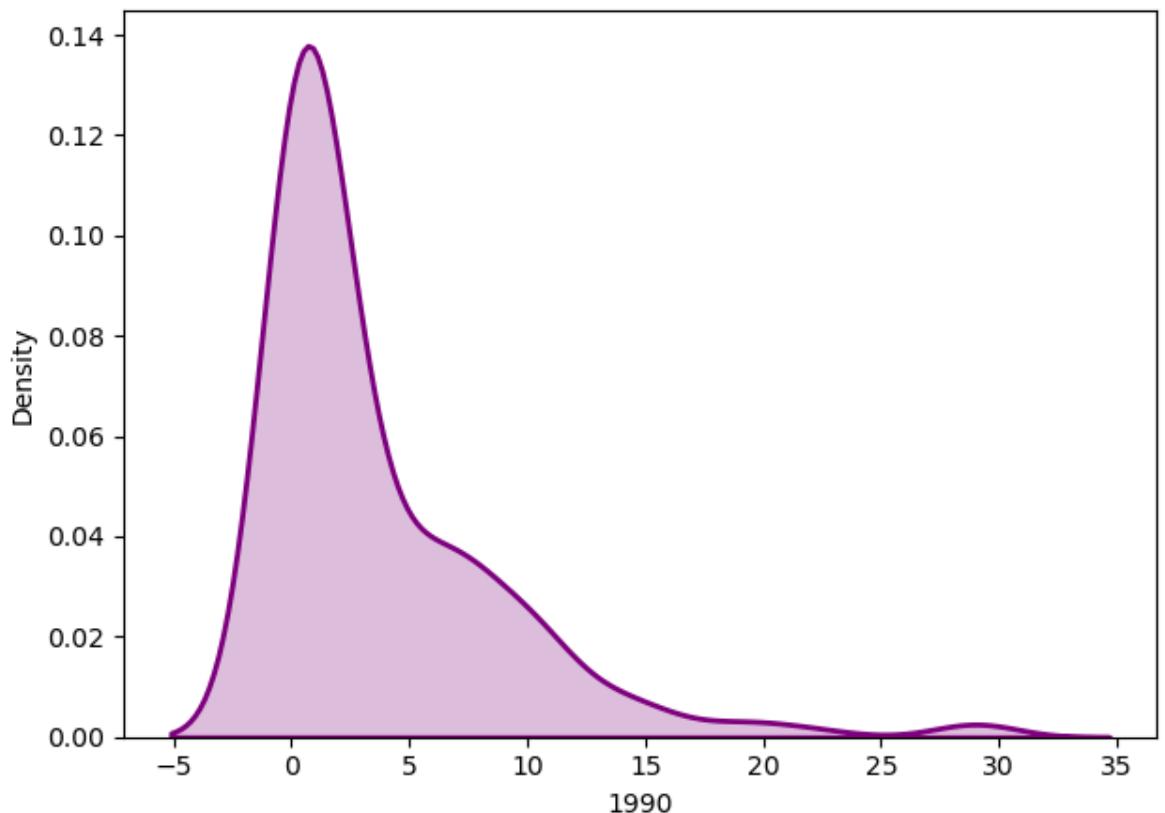


```
In [45]: # For all numeric columns
```

```
In [46]: from scipy.stats import skew,kurtosis

for i in num:
    sns.kdeplot(df[i], fill=True, color='purple', linewidth=2)
    plt.title(f'Distribution of {i}')
    plt.tight_layout()
    plt.show()
    skewness = df[i].skew()
    kurtosis = df[i].kurtosis()
    print(f'Skewness : {skewness}')
    print(f'Kurtosis : {kurtosis}')
    print()
    if skewness > -0.5 and skewness < 0.5:
        print(f'Distribution of {i}: Approximately normally ditributed.')
    elif skewness > 0.5:
        print(f'Distribution of {i}: Right skewed.')
    elif skewness <-0.5:
        print(f'Distribution of {i}: Left skewed.')
    print()
    print('Summary Statistics:')
    print()
    print(f'Mean of {i}: {df[i].mean()}')
    print(f'median of {i}: {df[i].median()}')
    print(f'mode of {i}: {df[i].mode()[0]}')
    print(f'var of {i}: {df[i].var()}')
    print(f'std of {i}: {df[i].std()}')
    print(f'max of {i}: {df[i].max()}')
    print(f'min of {i}: {df[i].min()}')
    print(f'range of {i}: {df[i].max() - df[i].min()}')
    print()
    plt.figure(figsize=(8,2))
    sns.boxplot(x=df[i], color = 'lightblue')
    plt.title(f'Boxplot of {i}')
    plt.grid(True, axis='x')
    plt.tight_layout()
    plt.show()
    print()
    q1 = df[i].quantile(0.25)
    q3 = df[i].quantile(0.75)
    iqr = q3 - q1
    lf = q1-1.5*iqr
    uf = q3+1.5*iqr
    outliers = df[(df[i]<lf) | (df[i]>uf)]
    print(f'Percentage of outliers in {i} is {outliers.shape[0]*100/df.shape[0]}')
    print('*'*10)
```

Distribution of 1990



Skewness : 2.2246285968410273

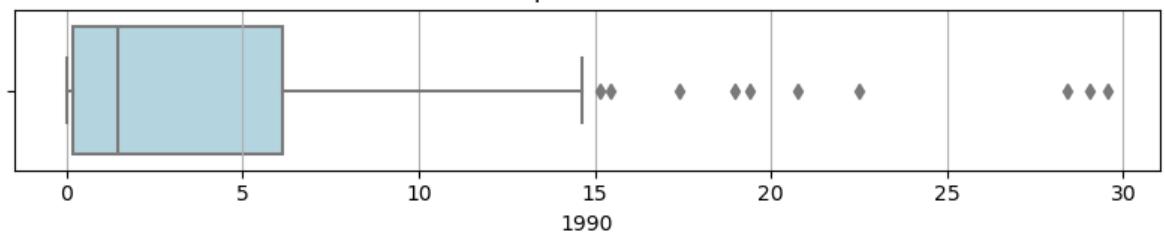
Kurtosis : 6.2641597754957505

Distribution of 1990: Right skewed.

Summary Statistics:

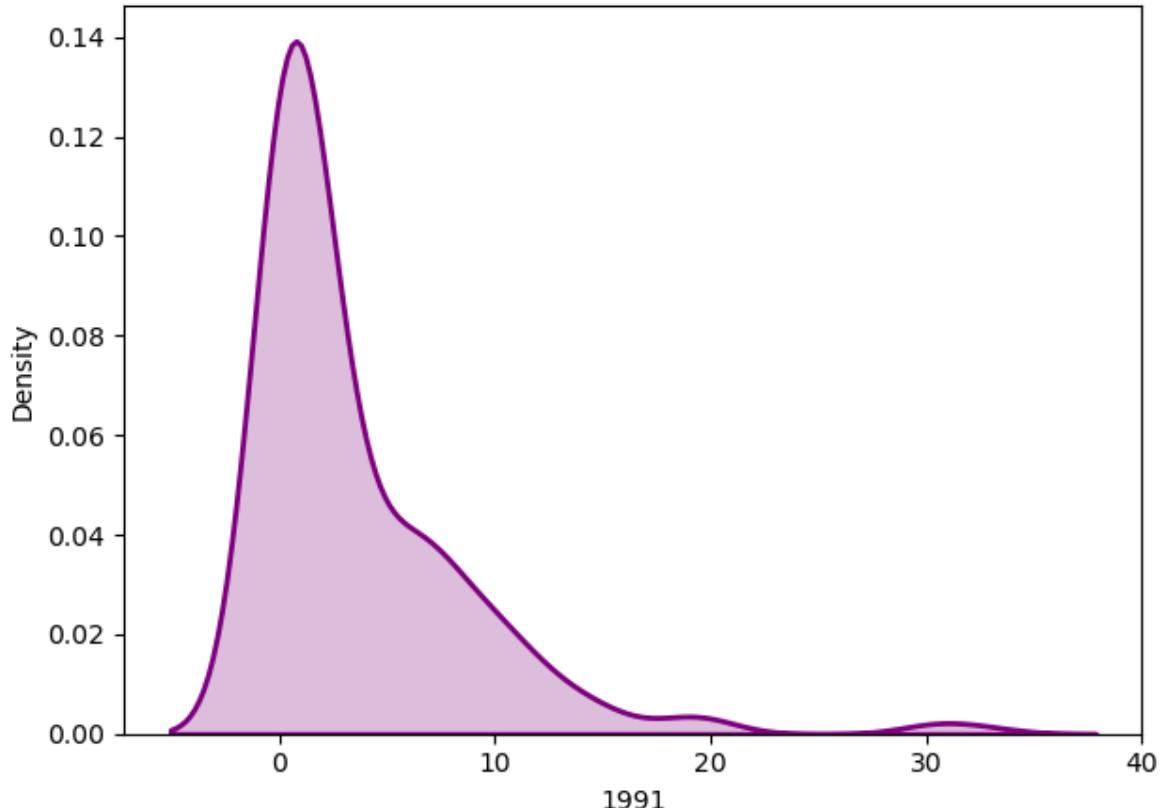
Mean of 1990: 3.7455845373248677
 median of 1990: 1.4669835689385042
 mode of 1990: 0.0
 var of 1990: 27.012270165483777
 std of 1990: 5.1973329858191475
 max of 1990: 29.566583737069532
 min of 1990: 0.0
 range of 1990: 29.566583737069532

Boxplot of 1990



Percentage of outliers in 1990 is 3.7735849056603774

Distribution of 1991



Skewness : 2.516683541689843

Kurtosis : 8.808705769268176

Distribution of 1991: Right skewed.

Summary Statistics:

Mean of 1991: 3.6659942277692967

median of 1991: 1.3937731192514833

mode of 1991: 0.0

var of 1991: 26.588190429853427

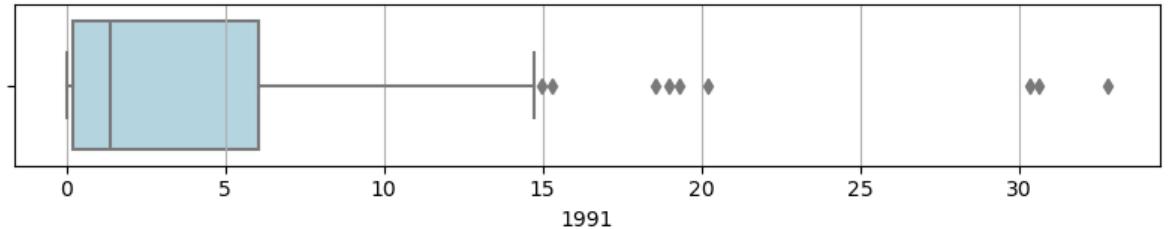
std of 1991: 5.156373767470065

max of 1991: 32.81590234968871

min of 1991: 0.0

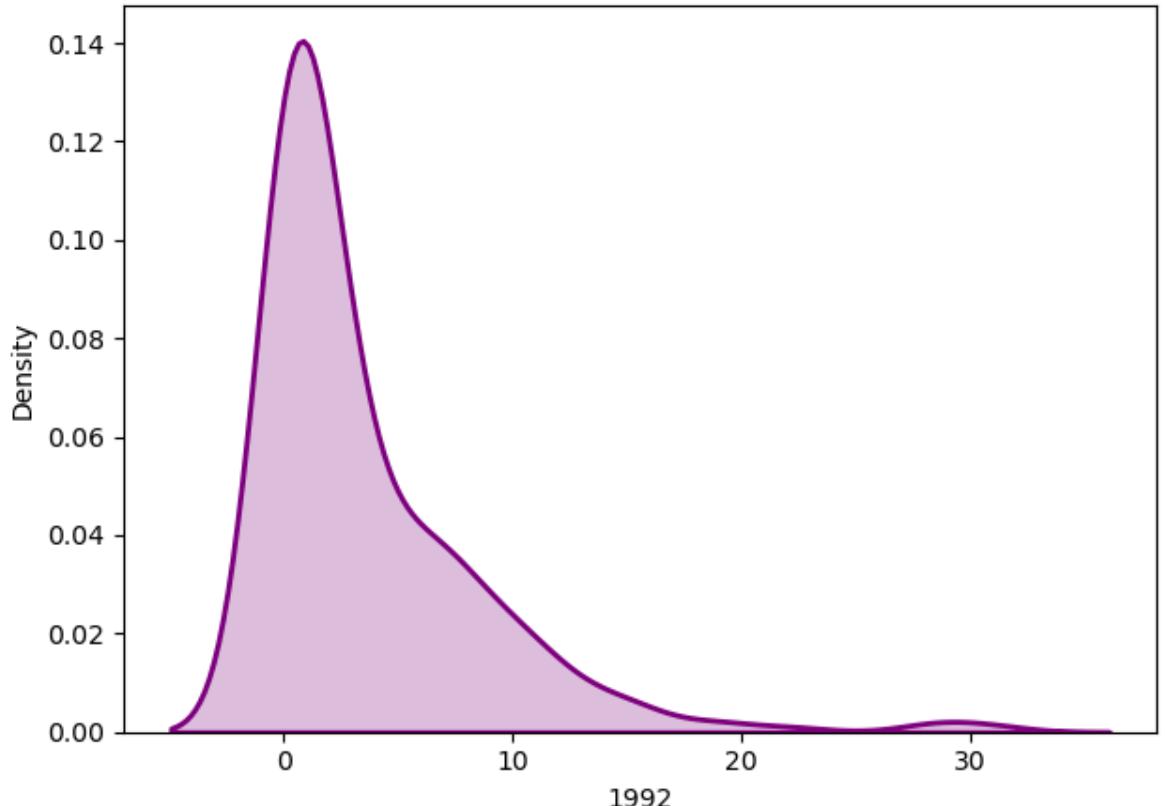
range of 1991: 32.81590234968871

Boxplot of 1991



Percentage of outliers in 1991 is 3.3962264150943398

Distribution of 1992



Skewness : 2.4000853965428868

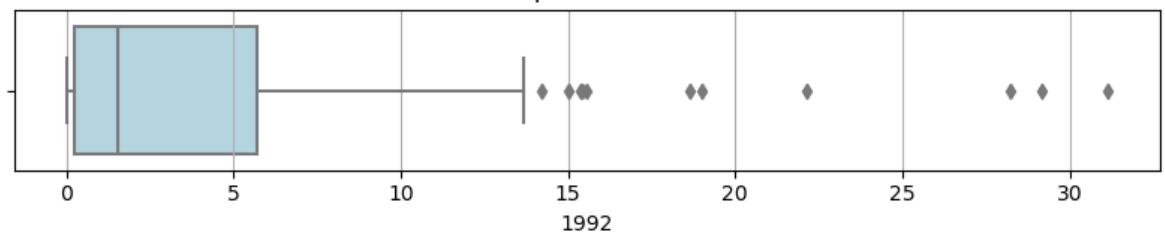
Kurtosis : 7.801213053392335

Distribution of 1992: Right skewed.

Summary Statistics:

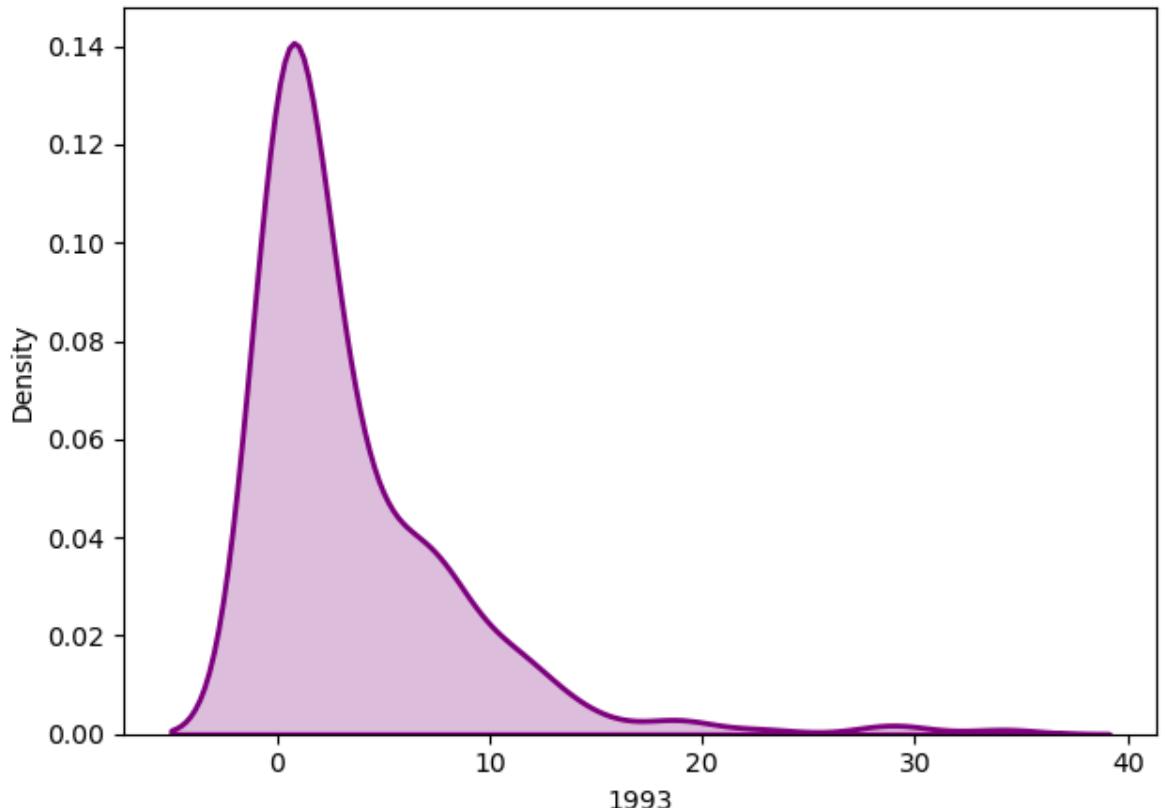
Mean of 1992: 3.6649236545317576
median of 1992: 1.5438571801086691
mode of 1992: 0.0
var of 1992: 25.104857220746013
std of 1992: 5.01047475003577
max of 1992: 31.148351450159456
min of 1992: 0.0
range of 1992: 31.148351450159456

Boxplot of 1992



Percentage of outliers in 1992 is 4.150943396226415

Distribution of 1993



Skewness : 2.6400615749778606

Kurtosis : 9.704028077384358

Distribution of 1993: Right skewed.

Summary Statistics:

Mean of 1993: 3.6072262332816862

median of 1993: 1.4680982255586115

mode of 1993: 0.0

var of 1993: 25.497136540501625

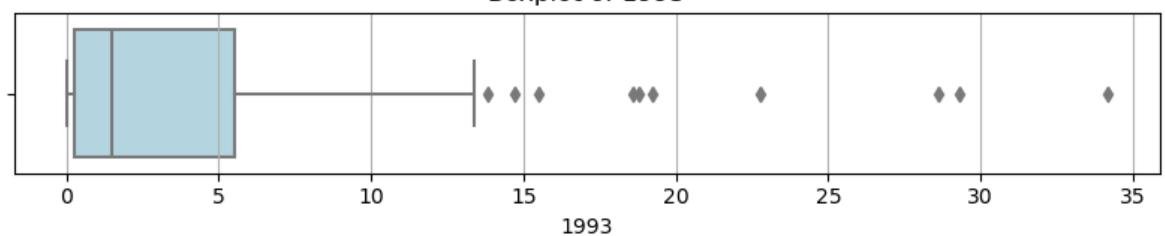
std of 1993: 5.049468936482492

max of 1993: 34.17407173468904

min of 1993: 0.0

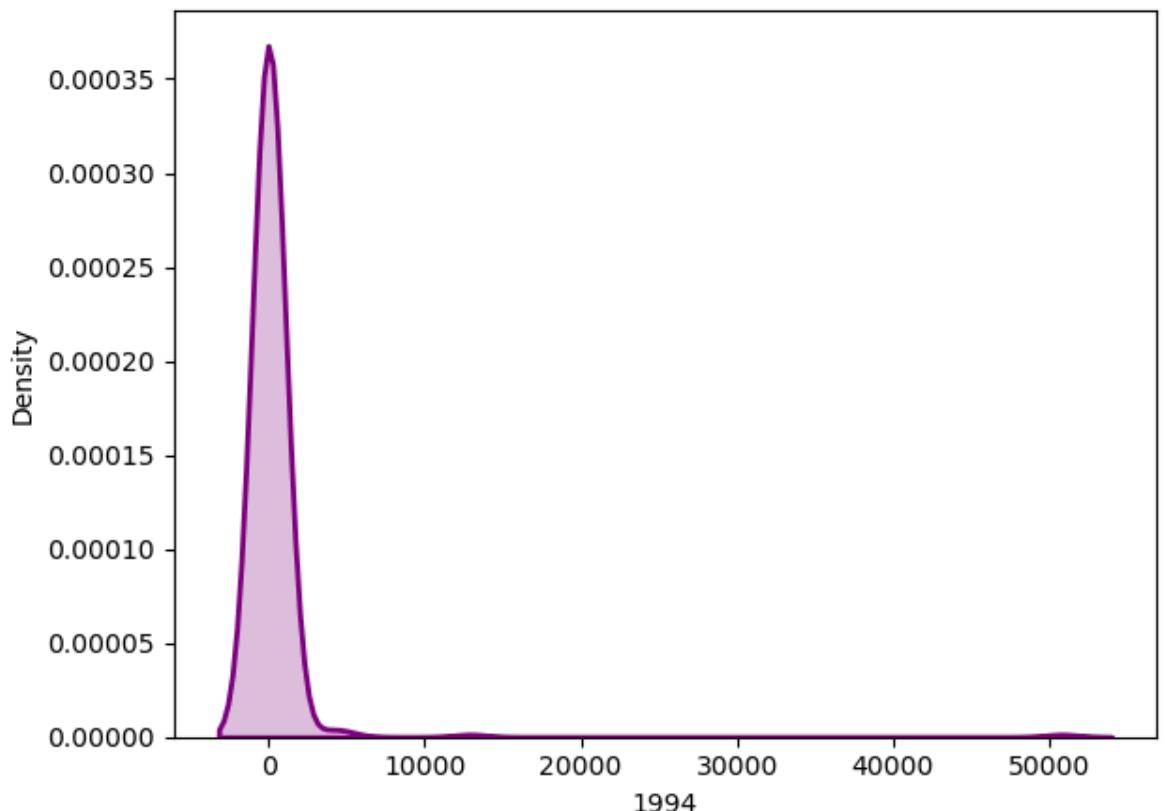
range of 1993: 34.17407173468904

Boxplot of 1993



Percentage of outliers in 1993 is 3.7735849056603774

Distribution of 1994



Skewness : 14.623239796733115

Kurtosis : 224.999075171601

Distribution of 1994: Right skewed.

Summary Statistics:

Mean of 1994: 297.53730460228354

median of 1994: 1.6087054366565718

mode of 1994: 0.0

var of 1994: 10530861.118402412

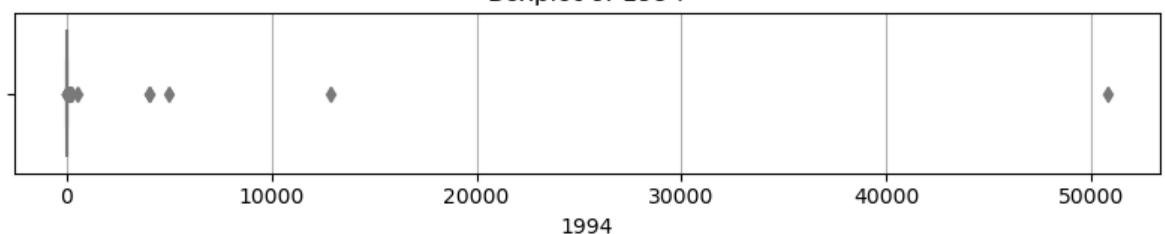
std of 1994: 3245.1288292458303

max of 1994: 50790.38025388562

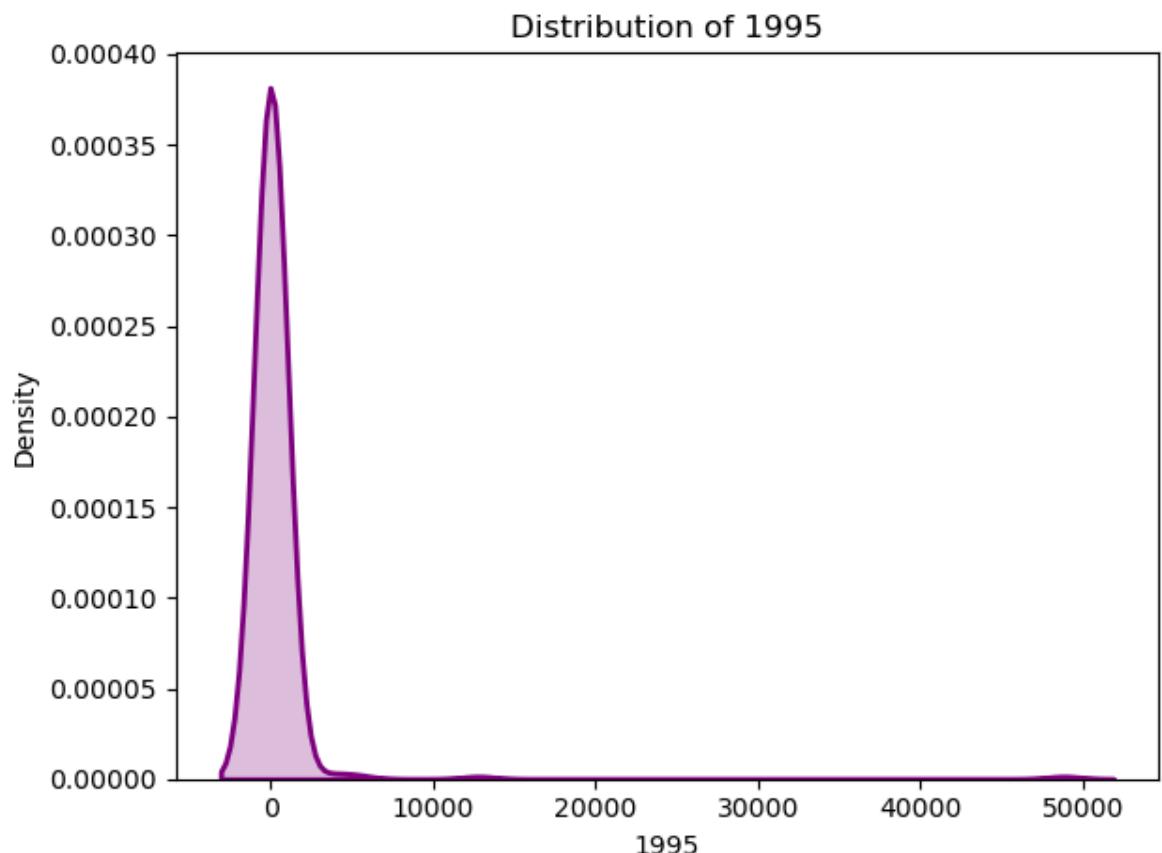
min of 1994: 0.0

range of 1994: 50790.38025388562

Boxplot of 1994



Percentage of outliers in 1994 is 7.547169811320755



Skewness : 14.528724755016807

Kurtosis : 222.61942648770525

Distribution of 1995: Right skewed.

Summary Statistics:

Mean of 1995: 288.61821331782284

median of 1995: 1.6488694318650925

mode of 1995: 0.0

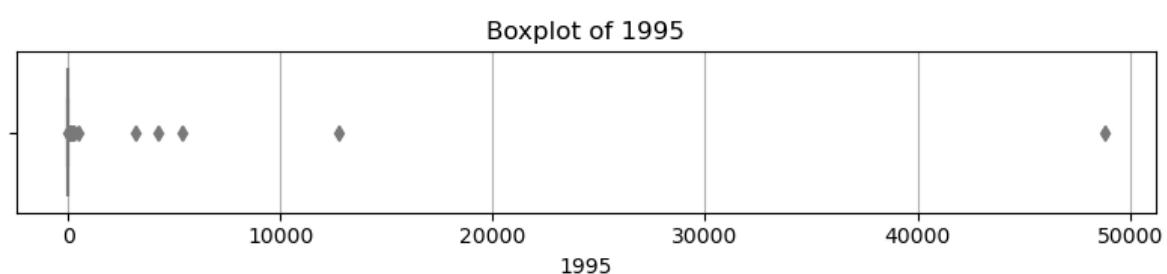
var of 1995: 9773930.592658136

std of 1995: 3126.32861239156

max of 1995: 48798.88548030725

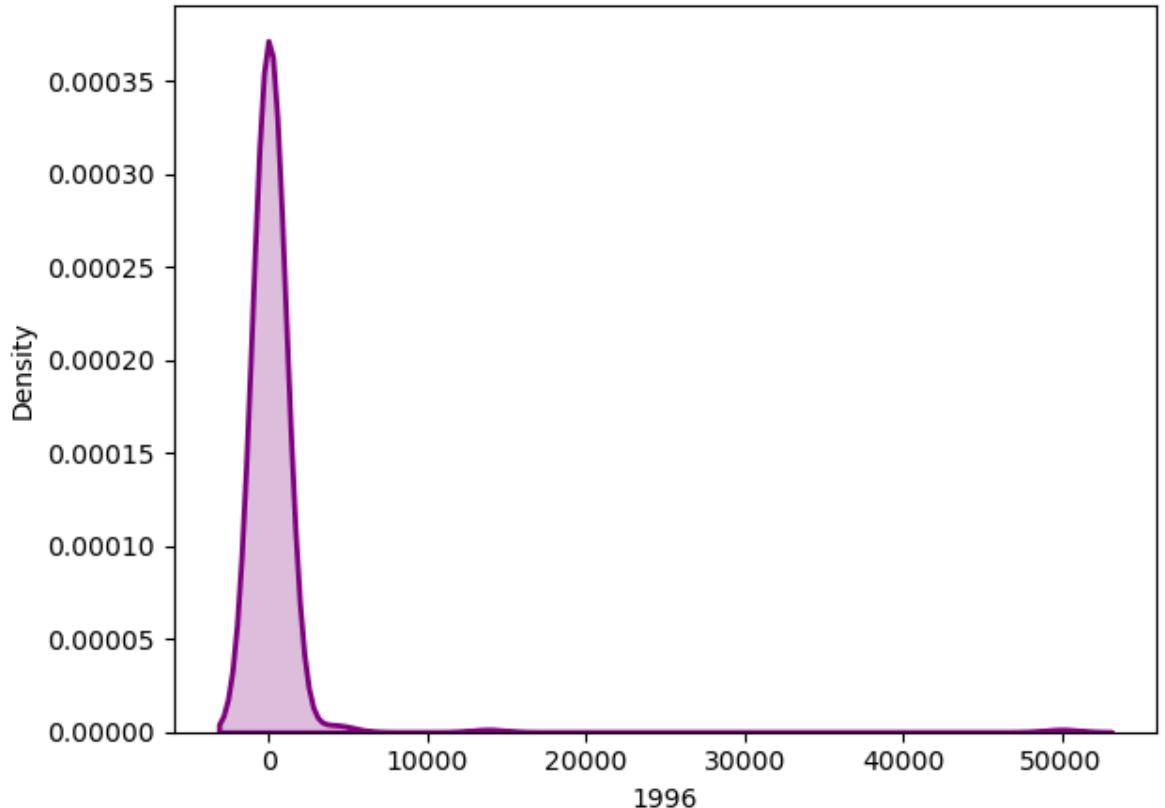
min of 1995: 0.0

range of 1995: 48798.88548030725



Percentage of outliers in 1995 is 7.169811320754717

Distribution of 1996



Skewness : 14.478784333618298

Kurtosis : 221.04410473694068

Distribution of 1996: Right skewed.

Summary Statistics:

Mean of 1996: 294.62789492038974

median of 1996: 1.7462842950832396

mode of 1996: 0.0

var of 1996: 10306162.68516124

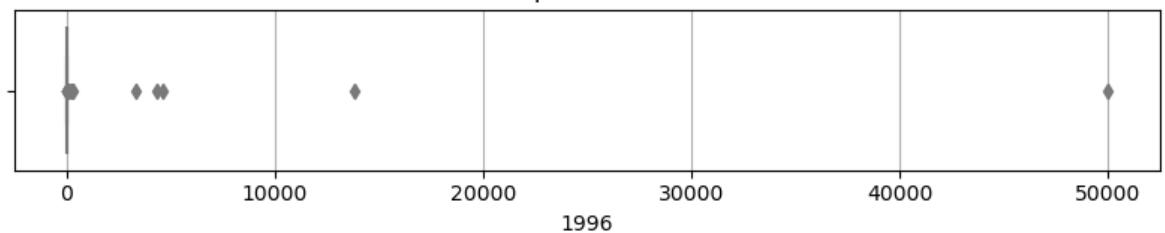
std of 1996: 3210.321274446101

max of 1996: 50008.09786188244

min of 1996: 0.0

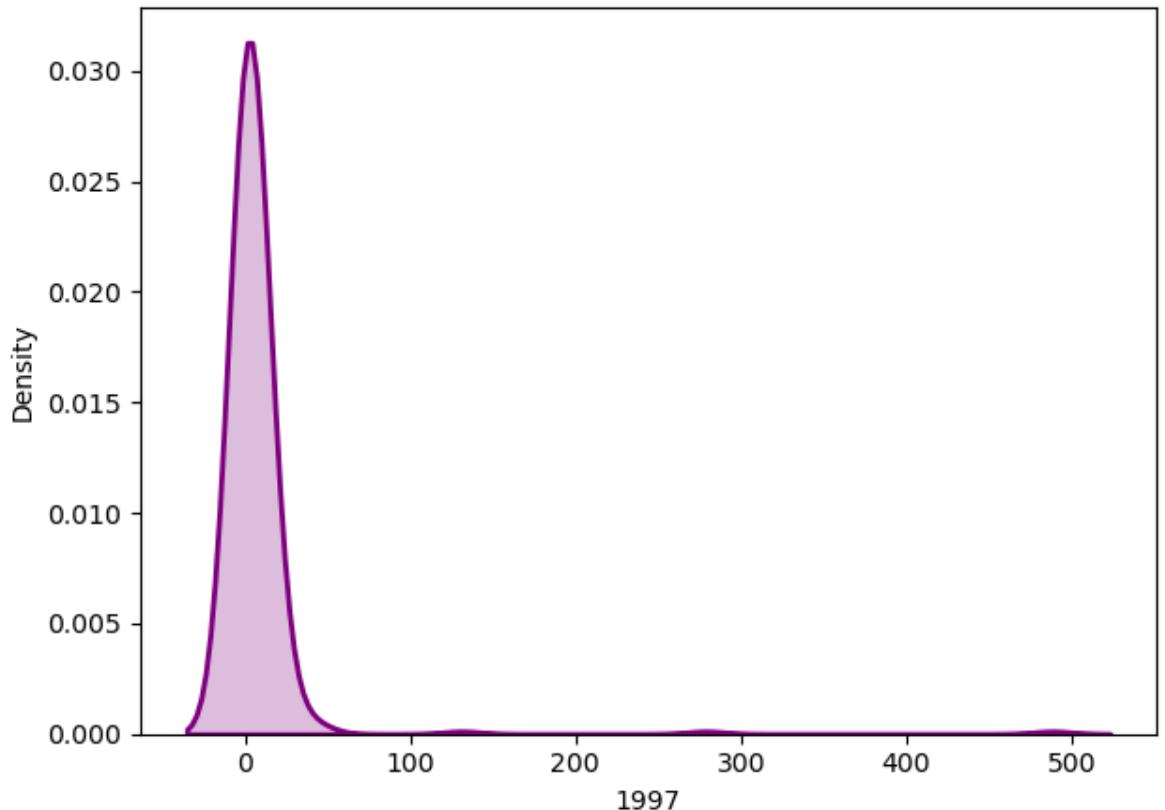
range of 1996: 50008.09786188244

Boxplot of 1996



Percentage of outliers in 1996 is 7.169811320754717

Distribution of 1997



Skewness : 11.31993008457828

Kurtosis : 140.4936812574111

Distribution of 1997: Right skewed.

Summary Statistics:

Mean of 1997: 7.297285776963528

median of 1997: 1.7133688066417077

mode of 1997: 0.0

var of 1997: 1263.7127383276136

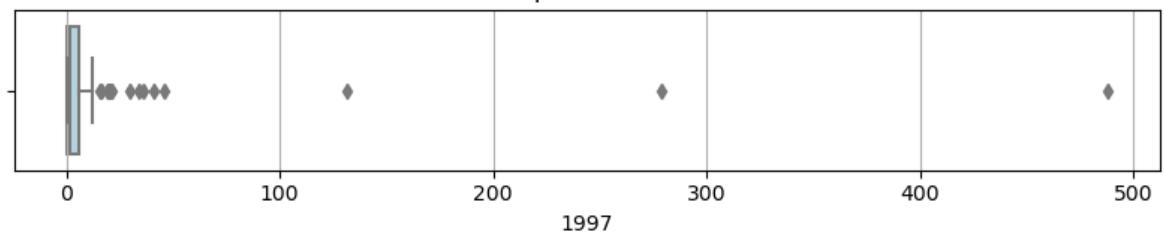
std of 1997: 35.54873750680344

max of 1997: 488.1790660285536

min of 1997: 0.0

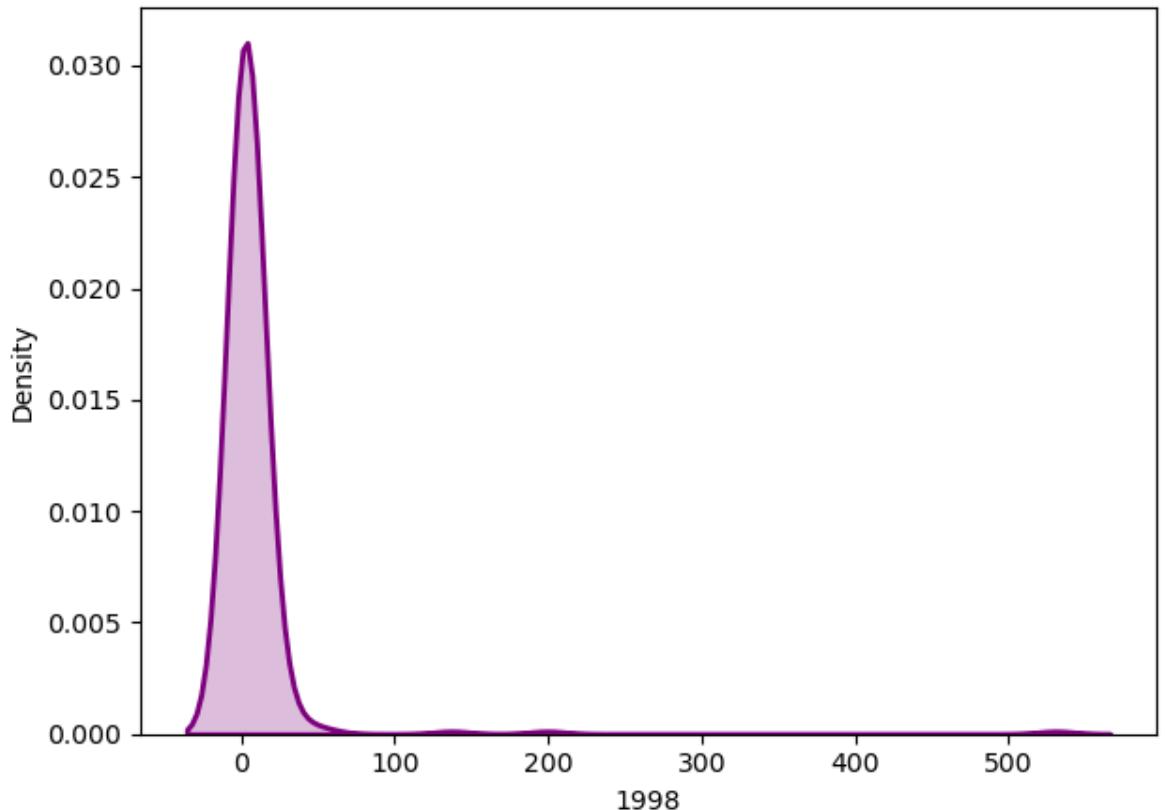
range of 1997: 488.1790660285536

Boxplot of 1997



Percentage of outliers in 1997 is 5.660377358490566

Distribution of 1998



Skewness : 12.50581826963129

Kurtosis : 173.95598641268876

Distribution of 1998: Right skewed.

Summary Statistics:

Mean of 1998: 7.255191058130465

median of 1998: 1.7715481399817268

mode of 1998: 0.0

var of 1998: 1295.428434779055

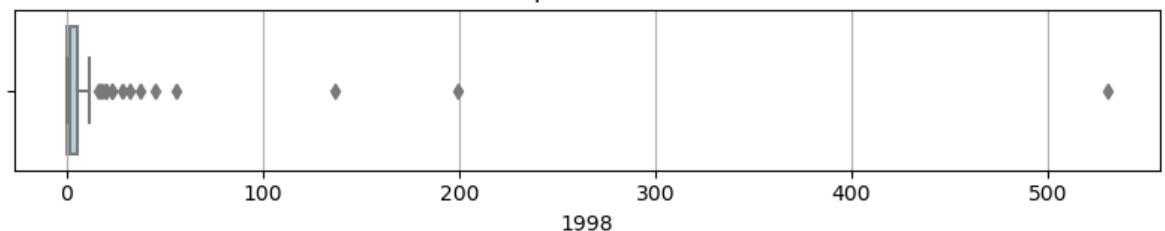
std of 1998: 35.99206071870649

max of 1998: 530.5653987790262

min of 1998: 0.0

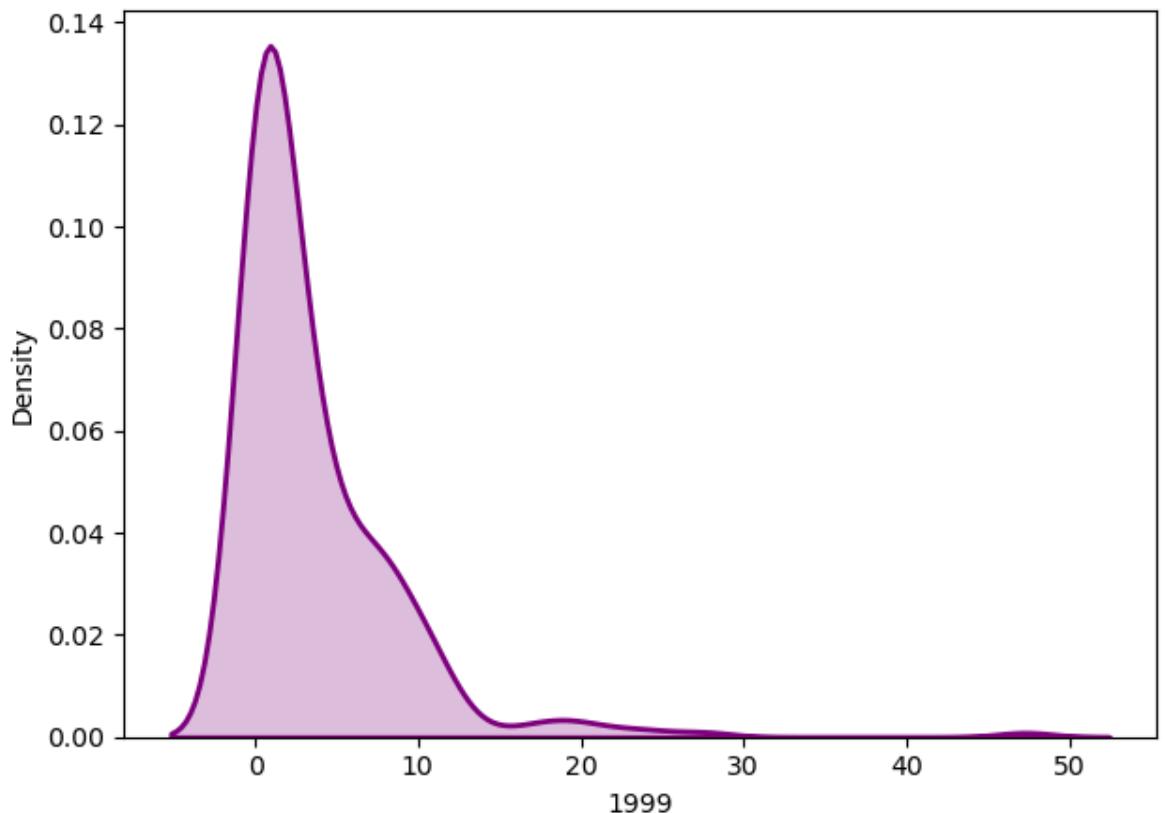
range of 1998: 530.5653987790262

Boxplot of 1998



Percentage of outliers in 1998 is 5.660377358490566

Distribution of 1999



Skewness : 3.5160936044989817

Kurtosis : 20.328880947561444

Distribution of 1999: Right skewed.

Summary Statistics:

Mean of 1999: 3.6403521597341255

median of 1999: 1.7347769418147825

mode of 1999: 0.0

var of 1999: 27.61366149503723

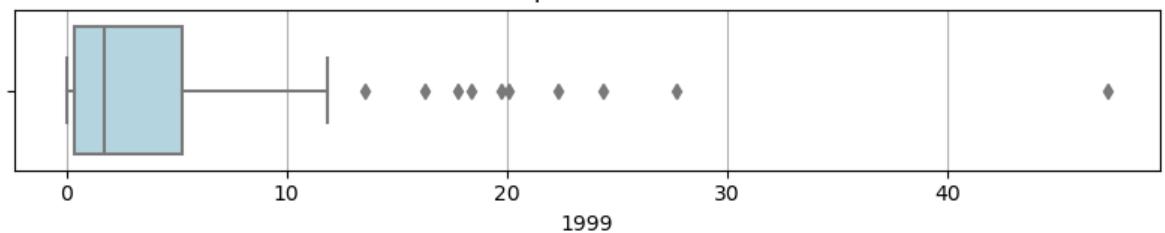
std of 1999: 5.254870264339285

max of 1999: 47.28502434363495

min of 1999: 0.0

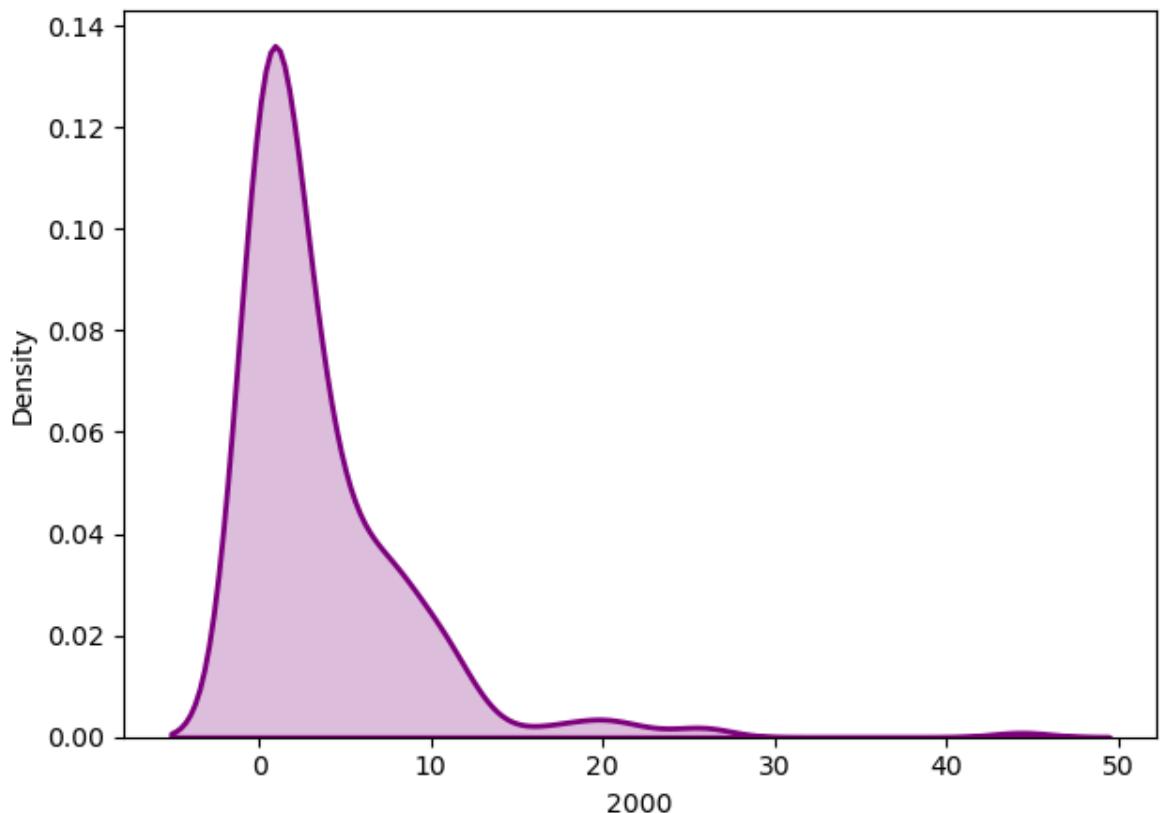
range of 1999: 47.28502434363495

Boxplot of 1999



Percentage of outliers in 1999 is 3.7735849056603774

Distribution of 2000



Skewness : 3.227184489367402

Kurtosis : 16.565488782718685

Distribution of 2000: Right skewed.

Summary Statistics:

Mean of 2000: 3.65229093358929

median of 2000: 1.7589850656171389

mode of 2000: 0.0

var of 2000: 27.14519386105234

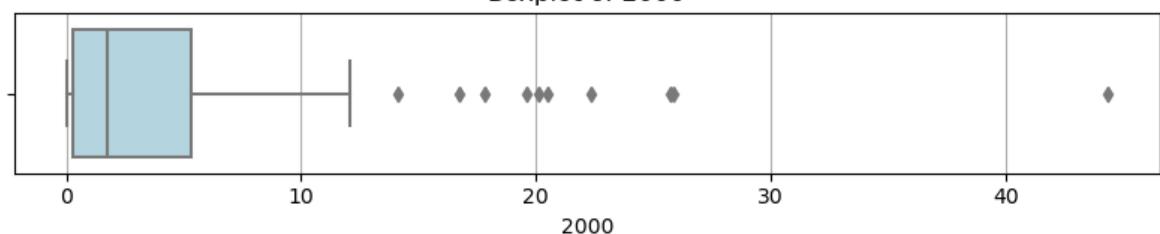
std of 2000: 5.2101049760107845

max of 2000: 44.369652148738965

min of 2000: 0.0

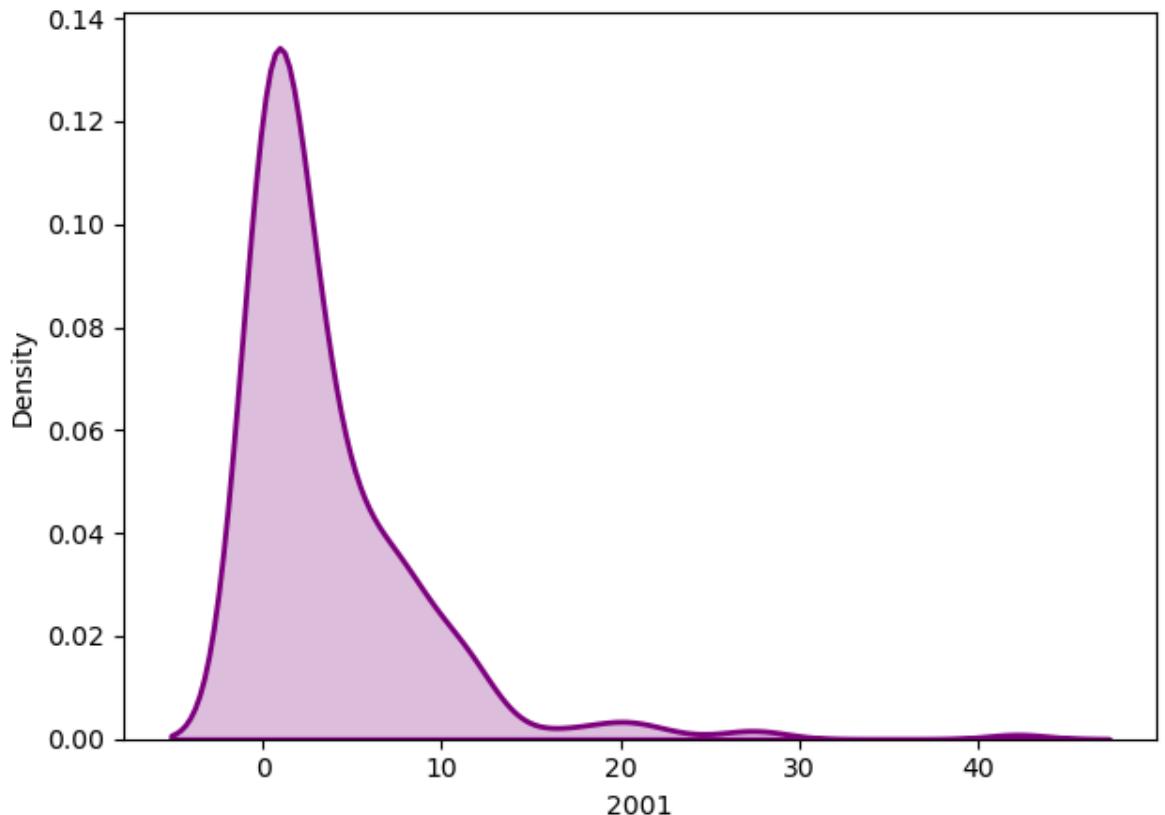
range of 2000: 44.369652148738965

Boxplot of 2000



Percentage of outliers in 2000 is 3.7735849056603774

Distribution of 2001



Skewness : 3.05252927460363

Kurtosis : 14.262224666936337

Distribution of 2001: Right skewed.

Summary Statistics:

Mean of 2001: 3.714076532089286

median of 2001: 1.887817551347275

mode of 2001: 0.0

var of 2001: 27.323557321801648

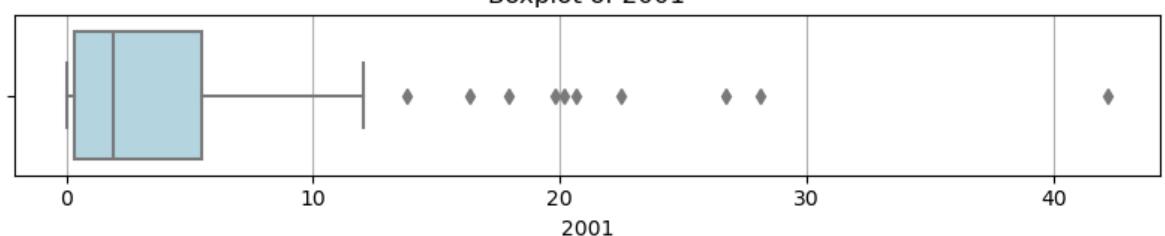
std of 2001: 5.2271940199117966

max of 2001: 42.20490814355856

min of 2001: 0.0

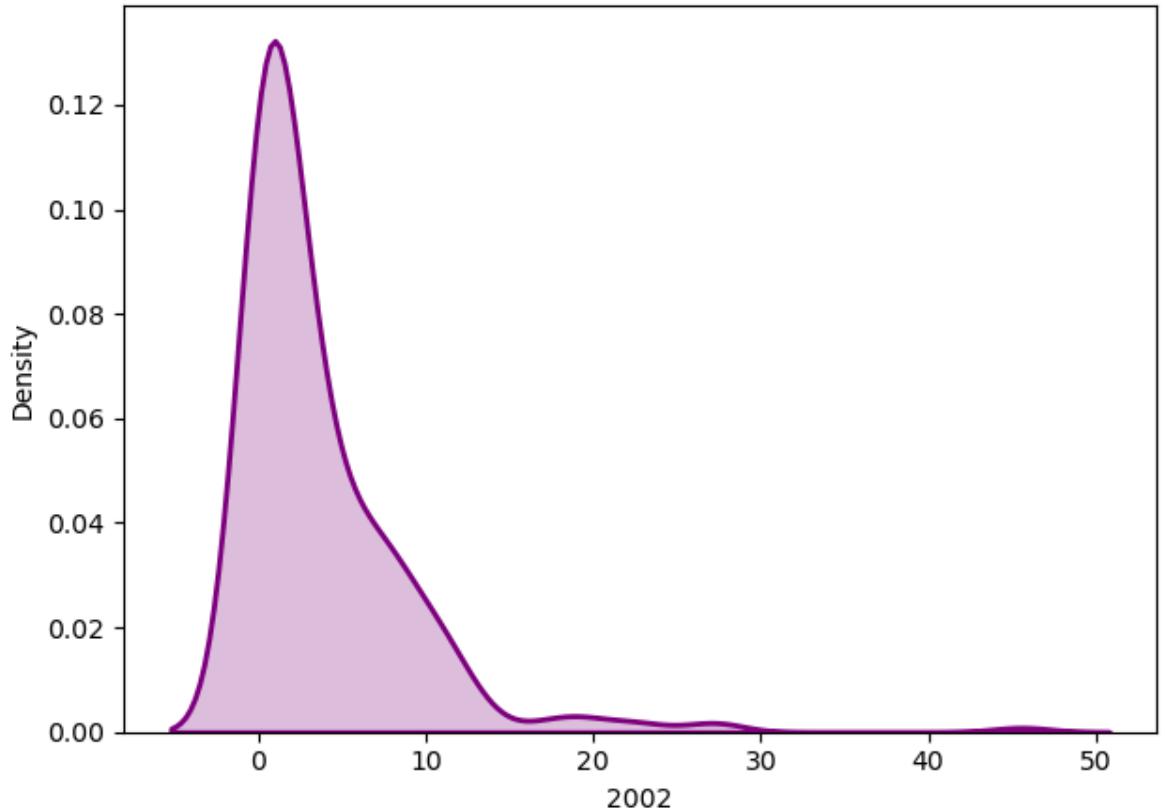
range of 2001: 42.20490814355856

Boxplot of 2001



Percentage of outliers in 2001 is 3.7735849056603774

Distribution of 2002



Skewness : 3.2681995584857533

Kurtosis : 17.001539291965834

Distribution of 2002: Right skewed.

Summary Statistics:

Mean of 2002: 3.748120355135881

median of 2002: 1.8491869871016646

mode of 2002: 0.0

var of 2002: 28.470639724592306

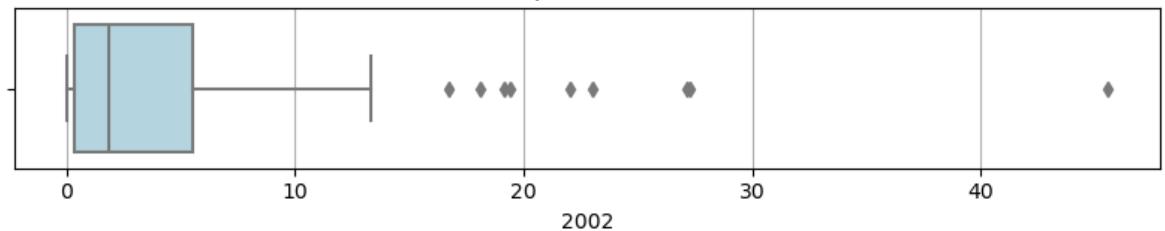
std of 2002: 5.335788575702031

max of 2002: 45.57015981805588

min of 2002: 0.0

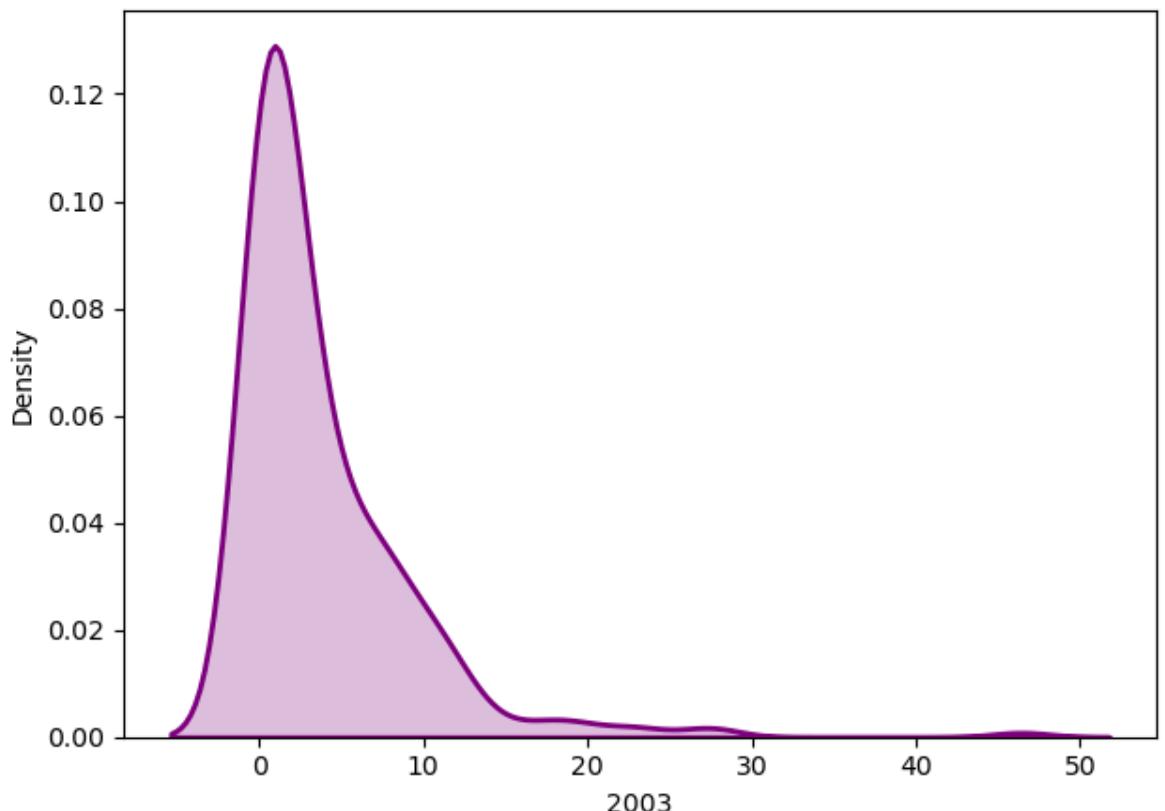
range of 2002: 45.57015981805588

Boxplot of 2002



Percentage of outliers in 2002 is 3.3962264150943398

Distribution of 2003



Skewness : 3.197805879936883

Kurtosis : 16.391419706282132

Distribution of 2003: Right skewed.

Summary Statistics:

Mean of 2003: 3.8592121829118513

median of 2003: 1.8539702816991404

mode of 2003: 0.0

var of 2003: 29.82602613303218

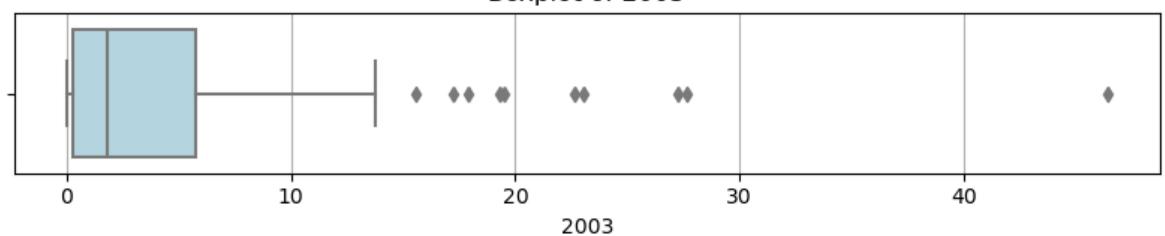
std of 2003: 5.461320914671851

max of 2003: 46.411277750865764

min of 2003: 0.0

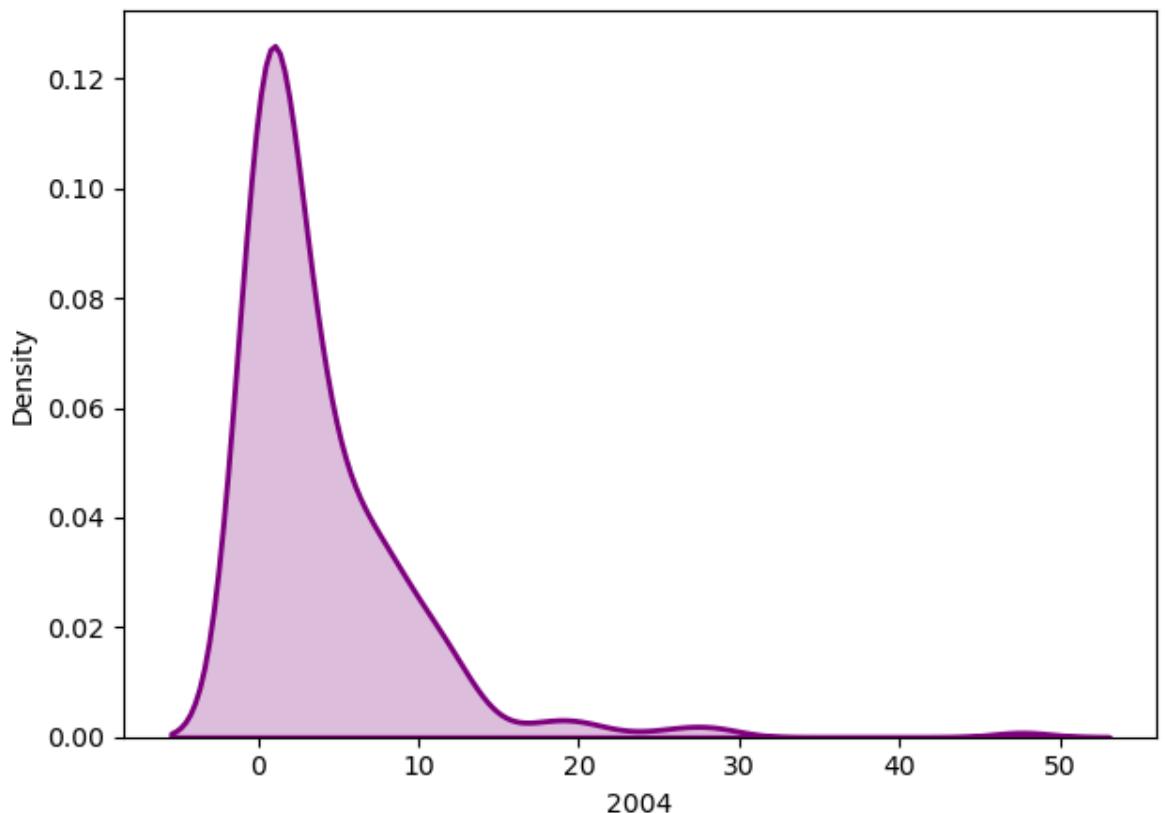
range of 2003: 46.411277750865764

Boxplot of 2003



Percentage of outliers in 2003 is 3.7735849056603774

Distribution of 2004



Skewness : 3.2997926528922945

Kurtosis : 17.512043888714516

Distribution of 2004: Right skewed.

Summary Statistics:

Mean of 2004: 3.918181506800712

median of 2004: 1.9108435264312333

mode of 2004: 0.0

var of 2004: 30.56291238659638

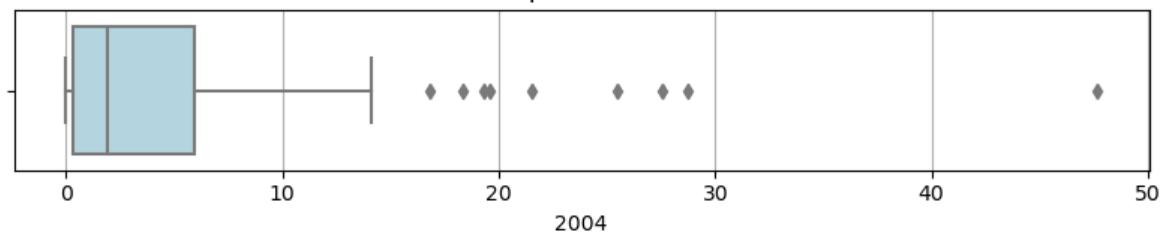
std of 2004: 5.528373394281213

max of 2004: 47.65130568026732

min of 2004: 0.0

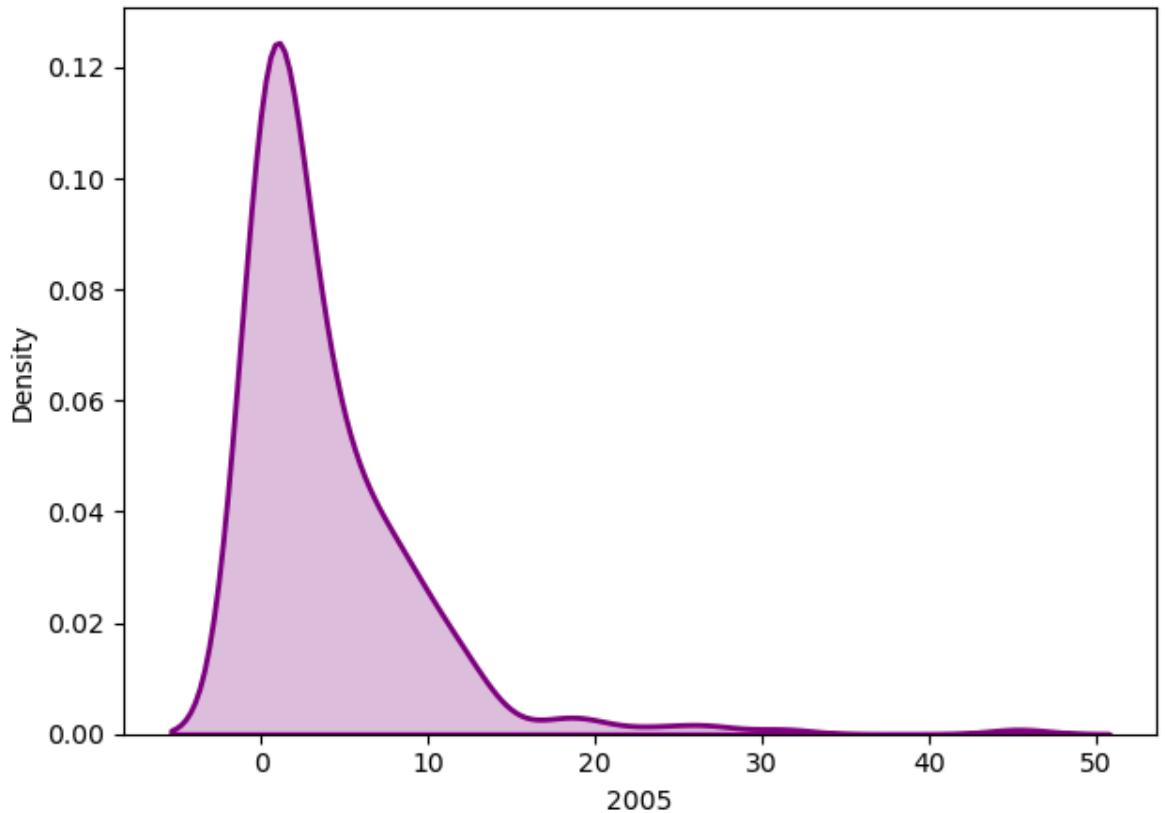
range of 2004: 47.65130568026732

Boxplot of 2004



Percentage of outliers in 2004 is 3.3962264150943398

Distribution of 2005



Skewness : 3.1661291032695282

Kurtosis : 15.564326958435245

Distribution of 2005: Right skewed.

Summary Statistics:

Mean of 2005: 3.9577821650739926

median of 2005: 2.0493808802312223

mode of 2005: 0.0

var of 2005: 30.405757250658336

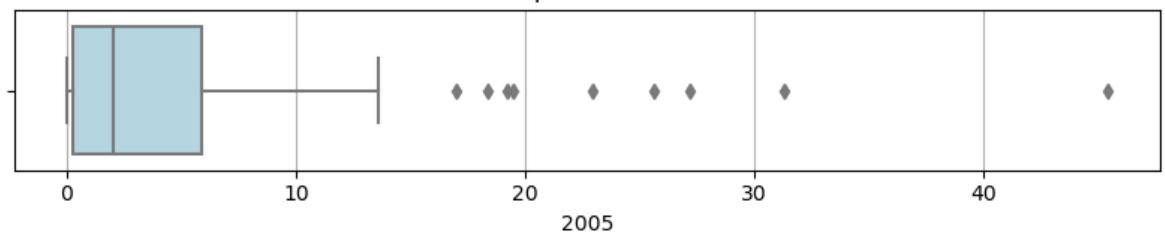
std of 2005: 5.514141569696804

max of 2005: 45.410094043344955

min of 2005: 0.0

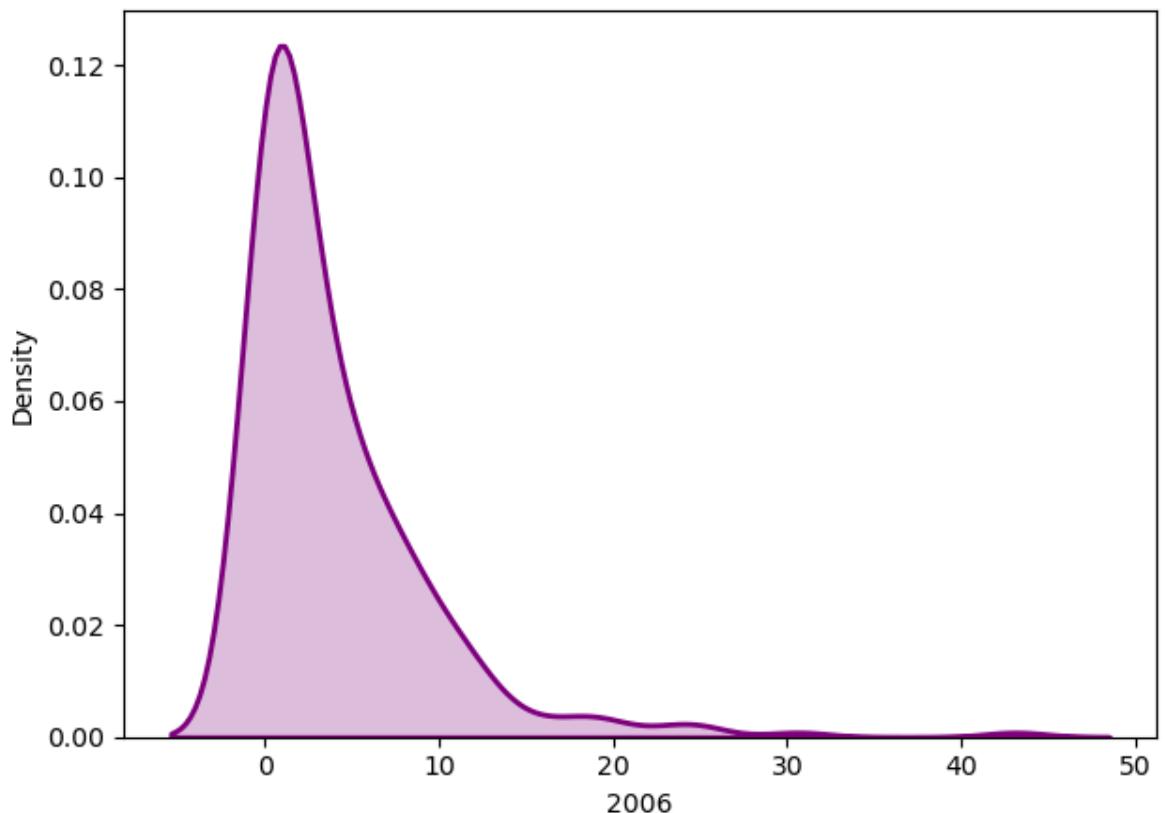
range of 2005: 45.410094043344955

Boxplot of 2005



Percentage of outliers in 2005 is 3.3962264150943398

Distribution of 2006



Skewness : 2.8993738155599598

Kurtosis : 12.819685827106182

Distribution of 2006: Right skewed.

Summary Statistics:

Mean of 2006: 4.015141487688553

median of 2006: 2.1205950485859364

mode of 2006: 0.0

var of 2006: 30.057198783537785

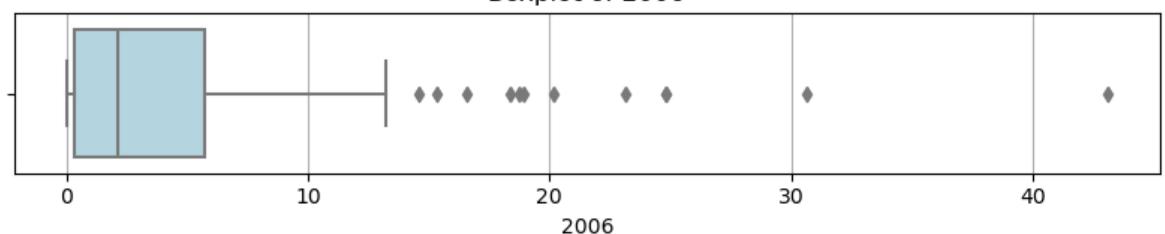
std of 2006: 5.482444599221937

max of 2006: 43.12060415912725

min of 2006: 0.0

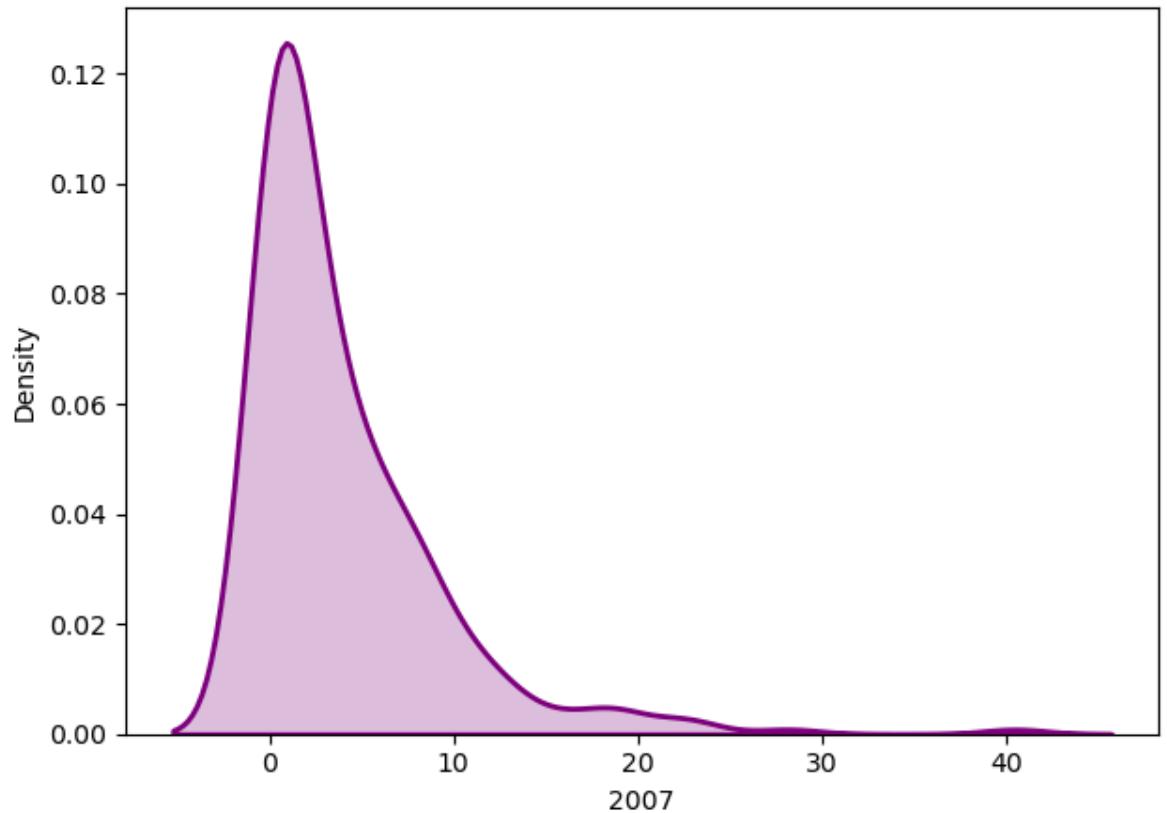
range of 2006: 43.12060415912725

Boxplot of 2006



Percentage of outliers in 2006 is 4.528301886792453

Distribution of 2007



Skewness : 2.6534362808147227

Kurtosis : 10.660322262329665

Distribution of 2007: Right skewed.

Summary Statistics:

Mean of 2007: 4.000285859795727

median of 2007: 2.1797323414211185

mode of 2007: 0.0

var of 2007: 28.254010413747142

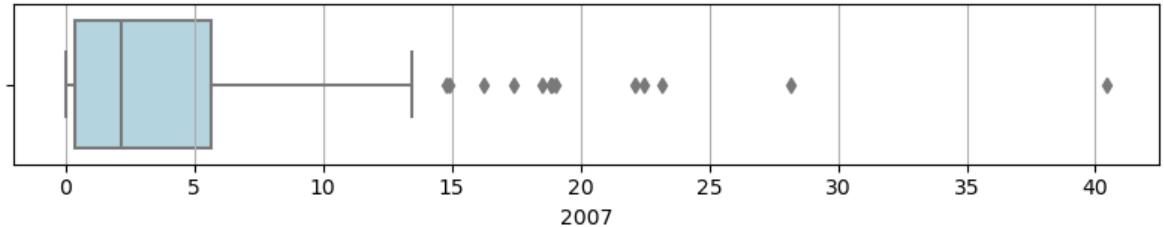
std of 2007: 5.315450160969167

max of 2007: 40.44994316150404

min of 2007: 0.0

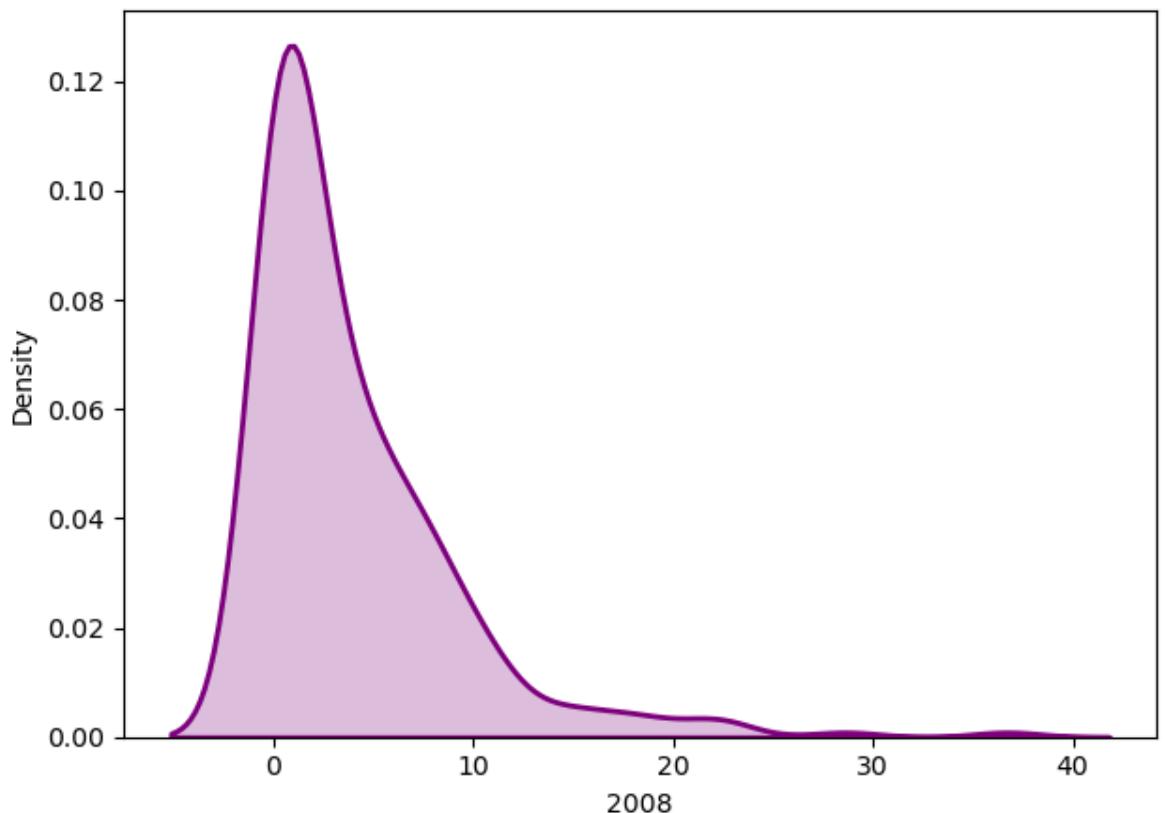
range of 2007: 40.44994316150404

Boxplot of 2007



Percentage of outliers in 2007 is 4.90566037735849

Distribution of 2008



Skewness : 2.4762728420798603

Kurtosis : 8.773252647256221

Distribution of 2008: Right skewed.

Summary Statistics:

Mean of 2008: 3.976560134620871

median of 2008: 2.186000158107863

mode of 2008: 0.0

var of 2008: 26.956266899544865

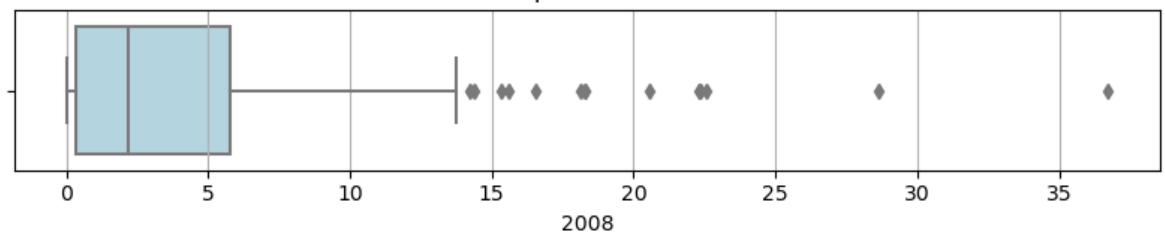
std of 2008: 5.191942497711706

max of 2008: 36.72425782279113

min of 2008: 0.0

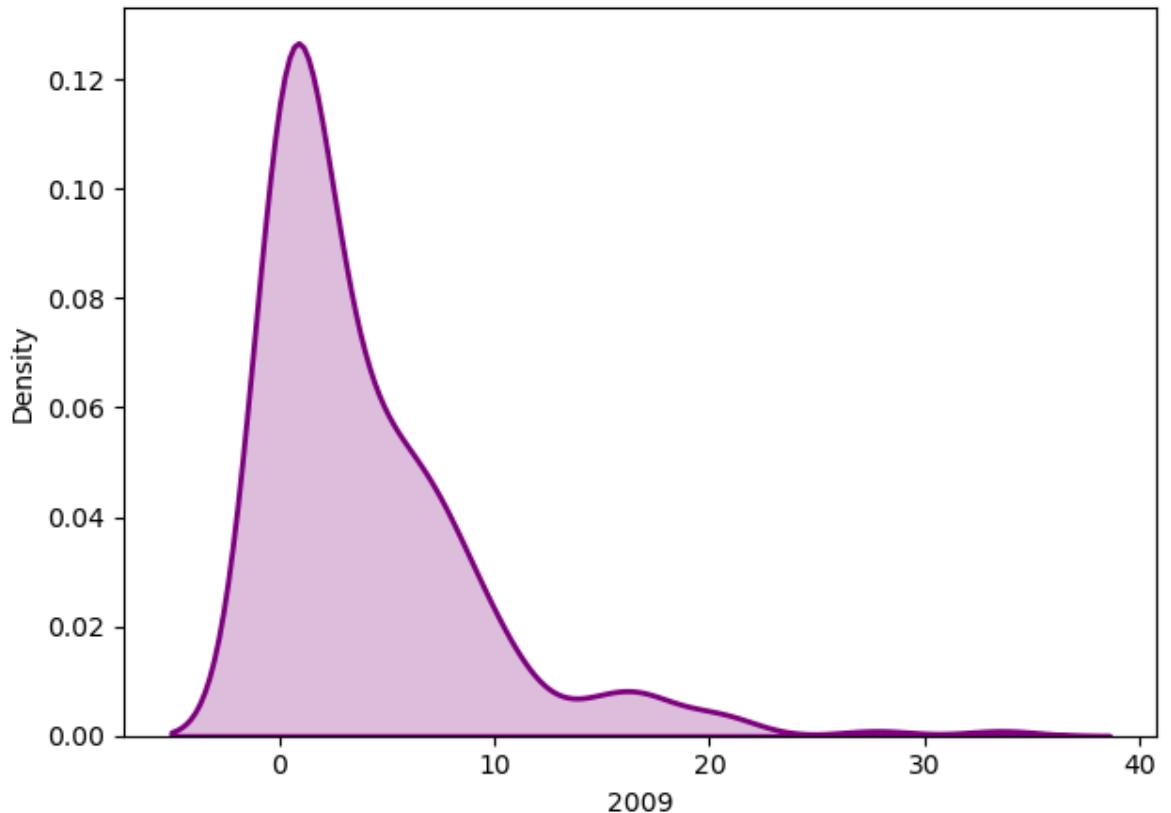
range of 2008: 36.72425782279113

Boxplot of 2008



Percentage of outliers in 2008 is 5.283018867924528

Distribution of 2009



Skewness : 2.1859607919913997

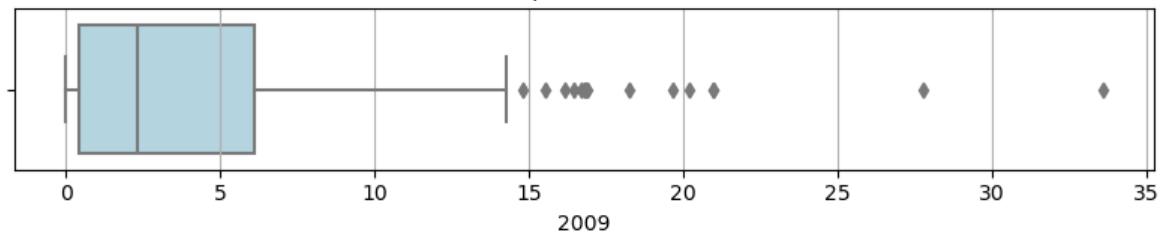
Kurtosis : 6.493881115797198

Distribution of 2009: Right skewed.

Summary Statistics:

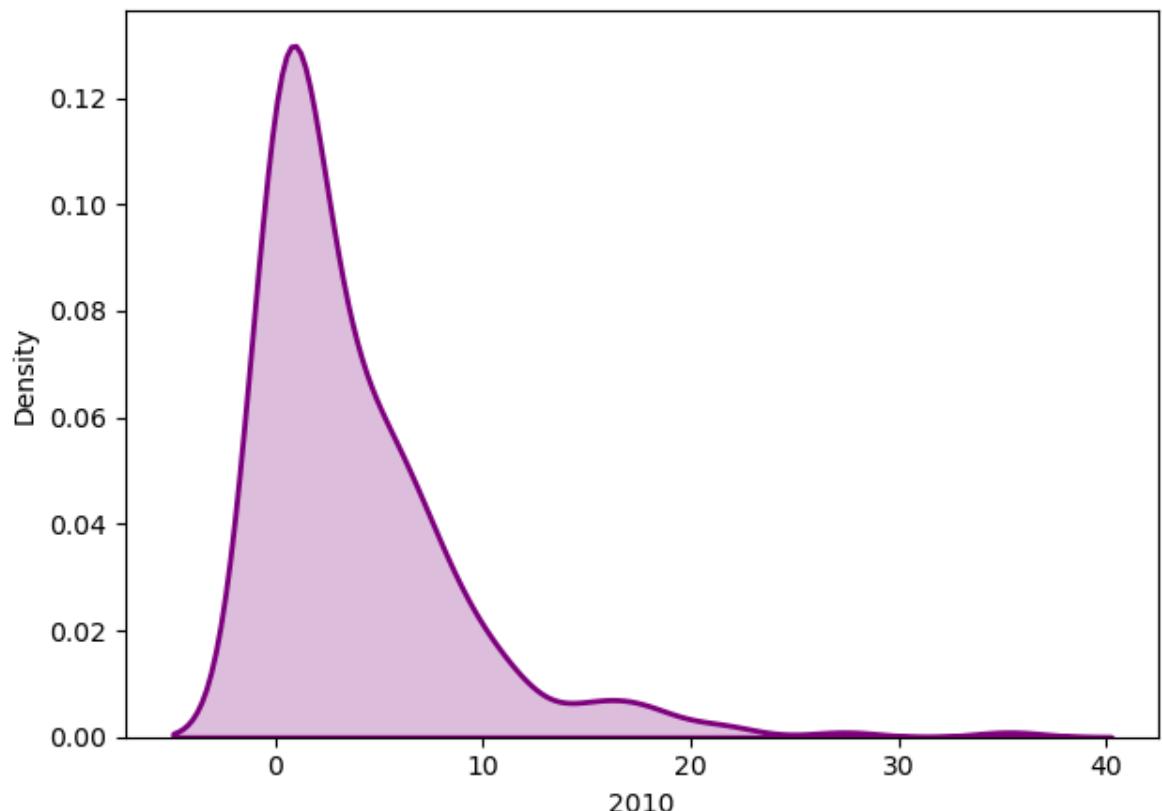
Mean of 2009: 4.0362205557425765
median of 2009: 2.293553313988328
mode of 2009: 0.0
var of 2009: 26.054017435256956
std of 2009: 5.104313610590258
max of 2009: 33.57813620217689
min of 2009: 0.0
range of 2009: 33.57813620217689

Boxplot of 2009



Percentage of outliers in 2009 is 5.660377358490566

Distribution of 2010



Skewness : 2.412494589183948

Kurtosis : 8.42084943491957

Distribution of 2010: Right skewed.

Summary Statistics:

Mean of 2010: 3.898930920209962

median of 2010: 2.1154376623775657

mode of 2010: 0.0

var of 2010: 24.892582013440602

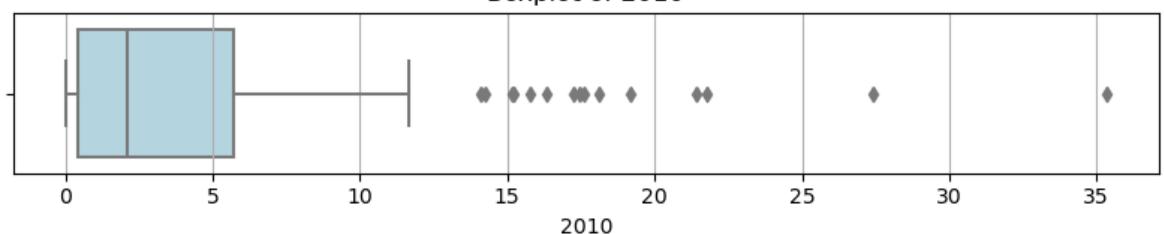
std of 2010: 4.989246637864338

max of 2010: 35.354456033399806

min of 2010: 0.0

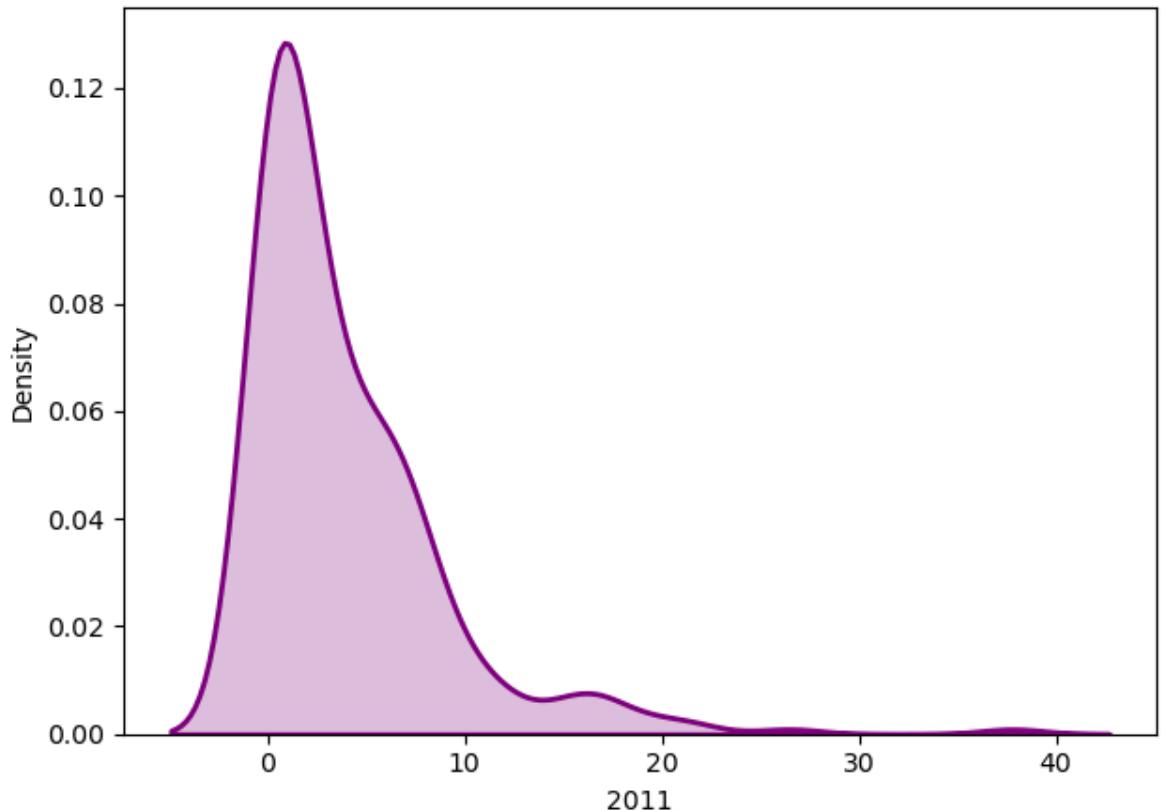
range of 2010: 35.354456033399806

Boxplot of 2010



Percentage of outliers in 2010 is 5.660377358490566

Distribution of 2011



Skewness : 2.551565174052991

Kurtosis : 10.024921992242357

Distribution of 2011: Right skewed.

Summary Statistics:

Mean of 2011: 3.9135947227176935

median of 2011: 2.263778074049756

mode of 2011: 0.0

var of 2011: 24.975234584725452

std of 2011: 4.997522844842778

max of 2011: 37.79575352968554

min of 2011: 0.0

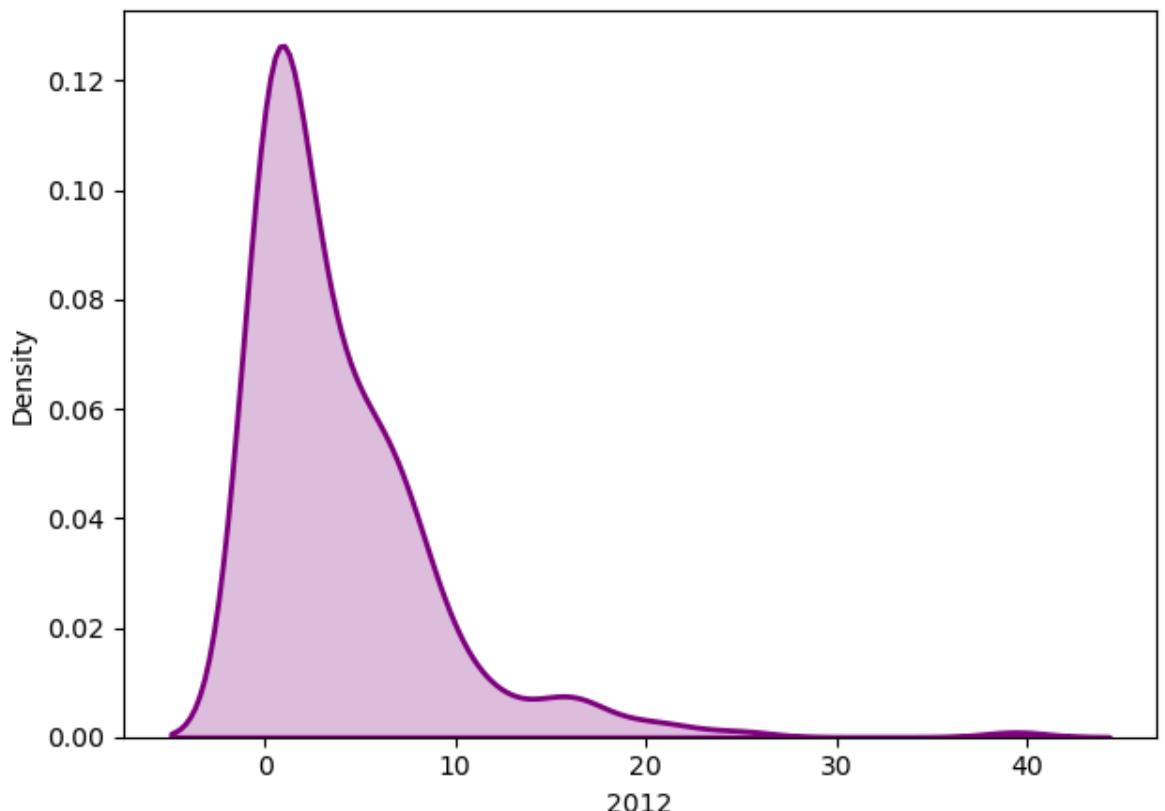
range of 2011: 37.79575352968554

Boxplot of 2011



Percentage of outliers in 2011 is 5.283018867924528

Distribution of 2012



Skewness : 2.6179291562320515

Kurtosis : 11.097005523708873

Distribution of 2012: Right skewed.

Summary Statistics:

Mean of 2012: 3.954157833574843

median of 2012: 2.2714032368934403

mode of 2012: 0.0

var of 2012: 25.090279783401762

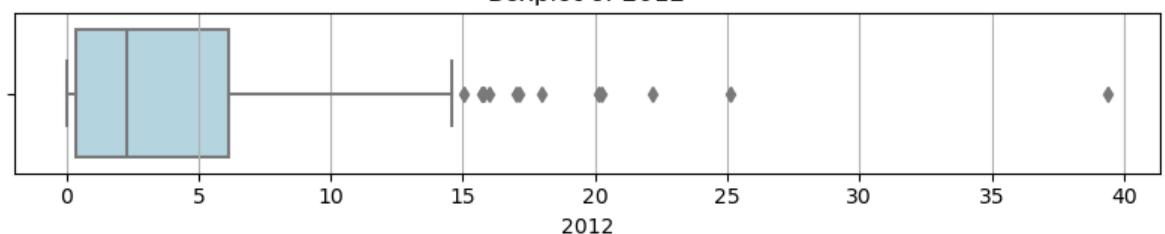
std of 2012: 5.009019842584152

max of 2012: 39.398424604102885

min of 2012: 0.0

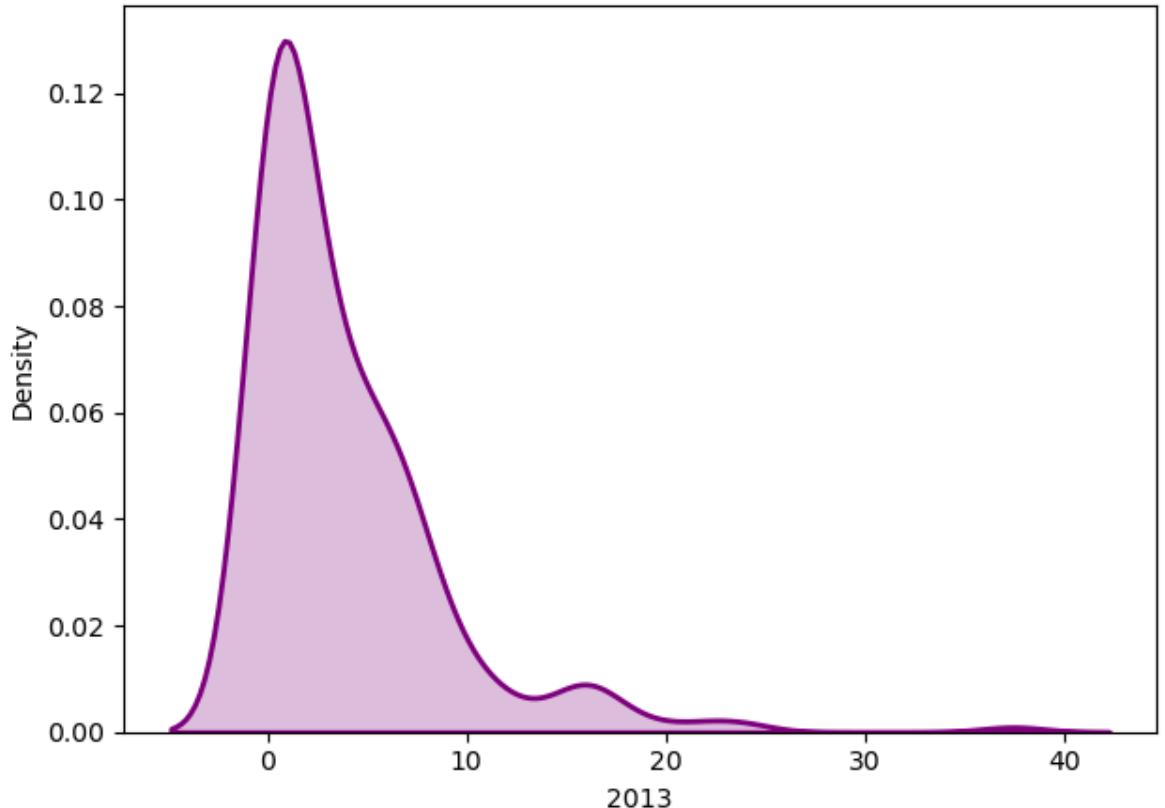
range of 2012: 39.398424604102885

Boxplot of 2012



Percentage of outliers in 2012 is 4.90566037735849

Distribution of 2013



Skewness : 2.550736531090271

Kurtosis : 9.999711803914094

Distribution of 2013: Right skewed.

Summary Statistics:

Mean of 2013: 3.8679812639221125

median of 2013: 2.176754900216611

mode of 2013: 0.0

var of 2013: 24.19707275366617

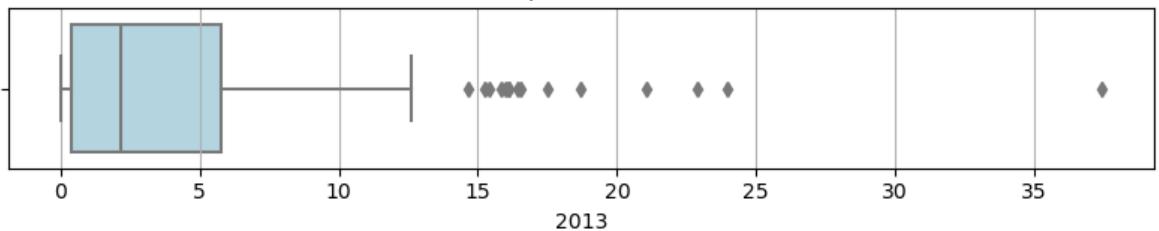
std of 2013: 4.919052017784135

max of 2013: 37.42076185123235

min of 2013: 0.0

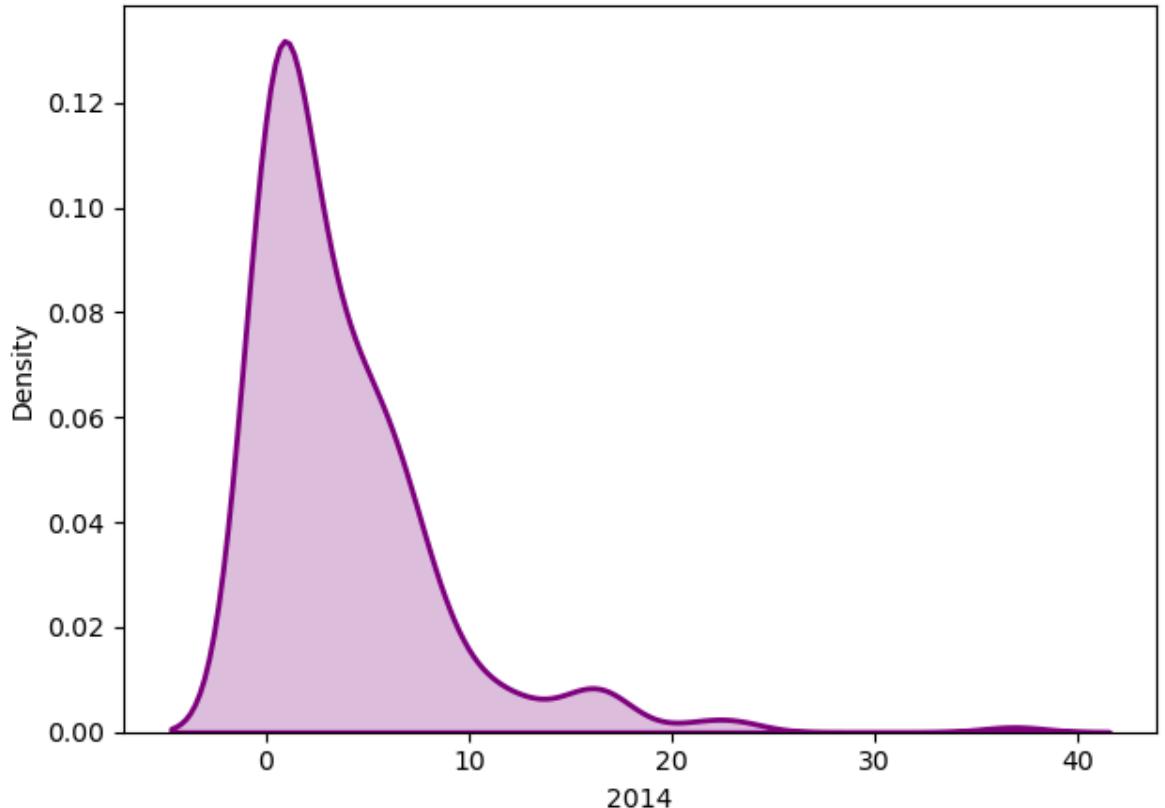
range of 2013: 37.42076185123235

Boxplot of 2013



Percentage of outliers in 2013 is 5.660377358490566

Distribution of 2014



Skewness : 2.6158456916508857

Kurtosis : 10.583323759655347

Distribution of 2014: Right skewed.

Summary Statistics:

Mean of 2014: 3.7811872851734916

median of 2014: 2.2772405188099016

mode of 2014: 0.0

var of 2014: 22.886292754593494

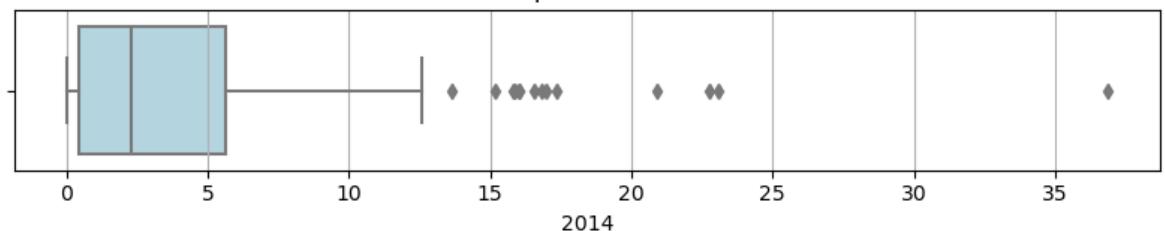
std of 2014: 4.783962035237476

max of 2014: 36.8757255870422

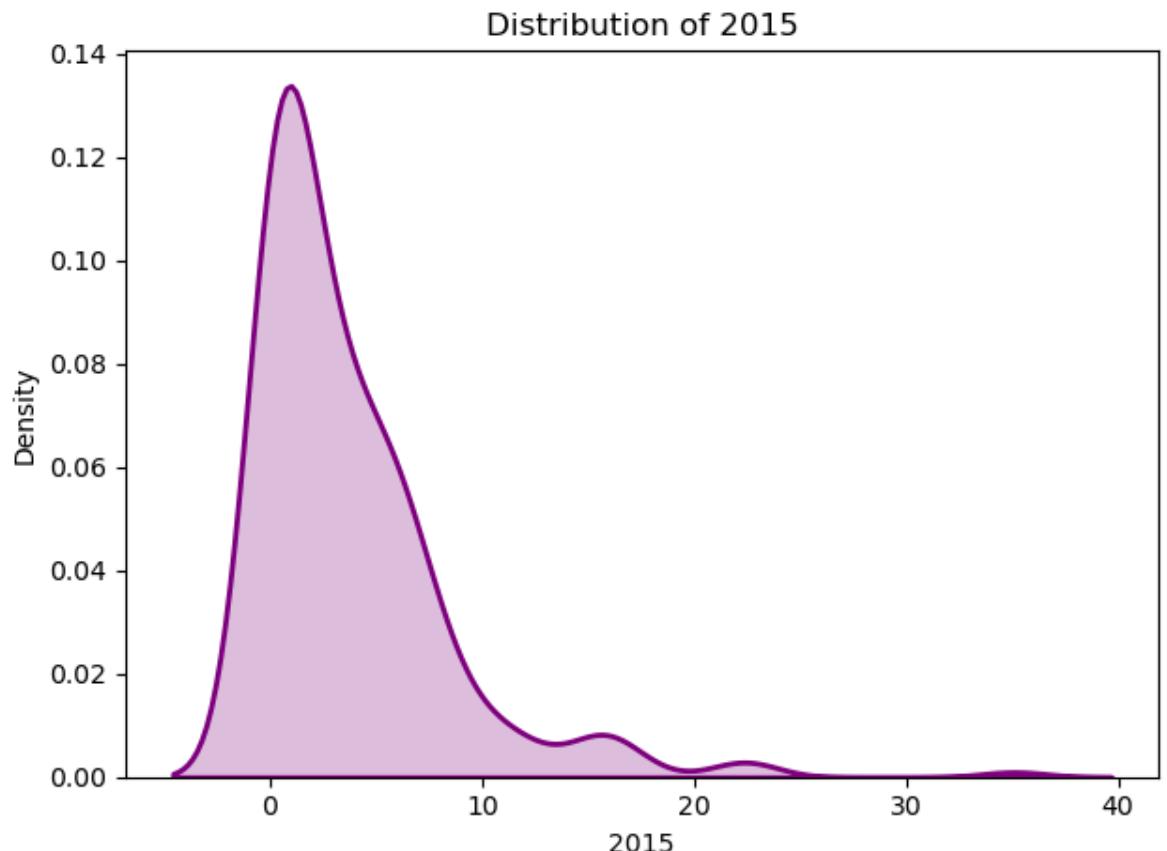
min of 2014: 0.0

range of 2014: 36.8757255870422

Boxplot of 2014



Percentage of outliers in 2014 is 5.283018867924528



Skewness : 2.561940028015428

Kurtosis : 9.979668903652128

Distribution of 2015: Right skewed.

Summary Statistics:

Mean of 2015: 3.734902377591368

median of 2015: 2.347814654119945

mode of 2015: 0.0

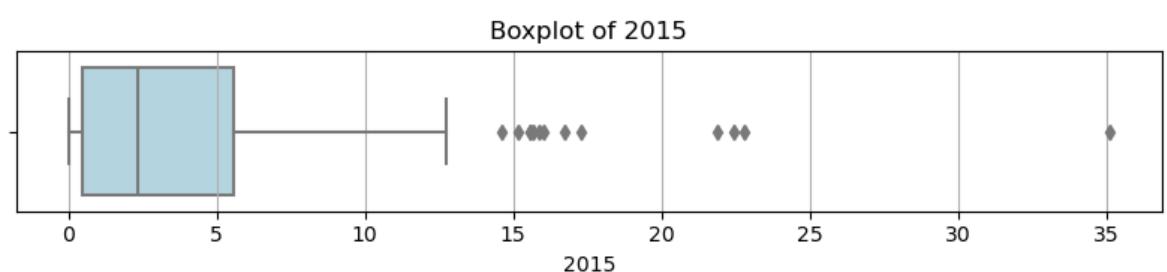
var of 2015: 21.70299410170421

std of 2015: 4.658647239457417

max of 2015: 35.11179772957658

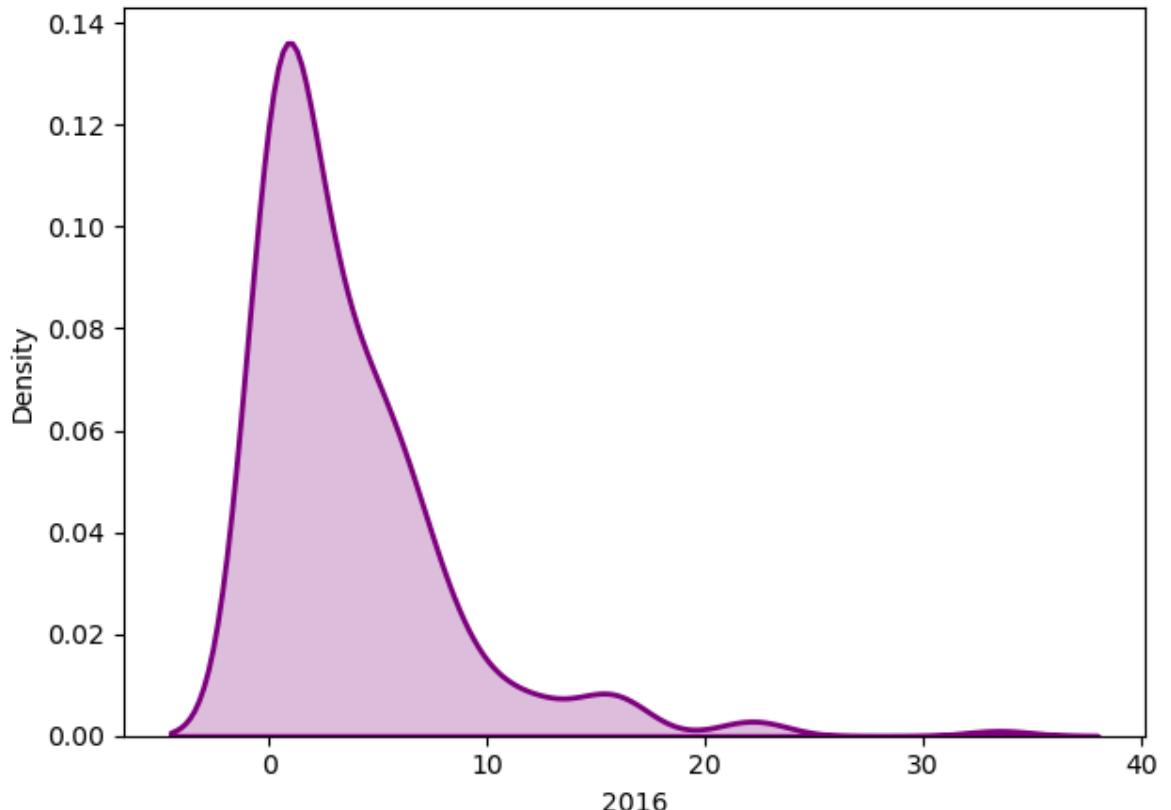
min of 2015: 0.0

range of 2015: 35.11179772957658



Percentage of outliers in 2015 is 4.90566037735849

Distribution of 2016



Skewness : 2.4760488856339546

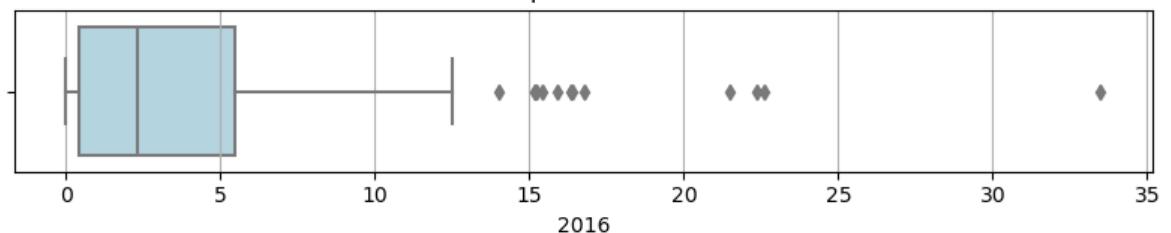
Kurtosis : 9.015544809414811

Distribution of 2016: Right skewed.

Summary Statistics:

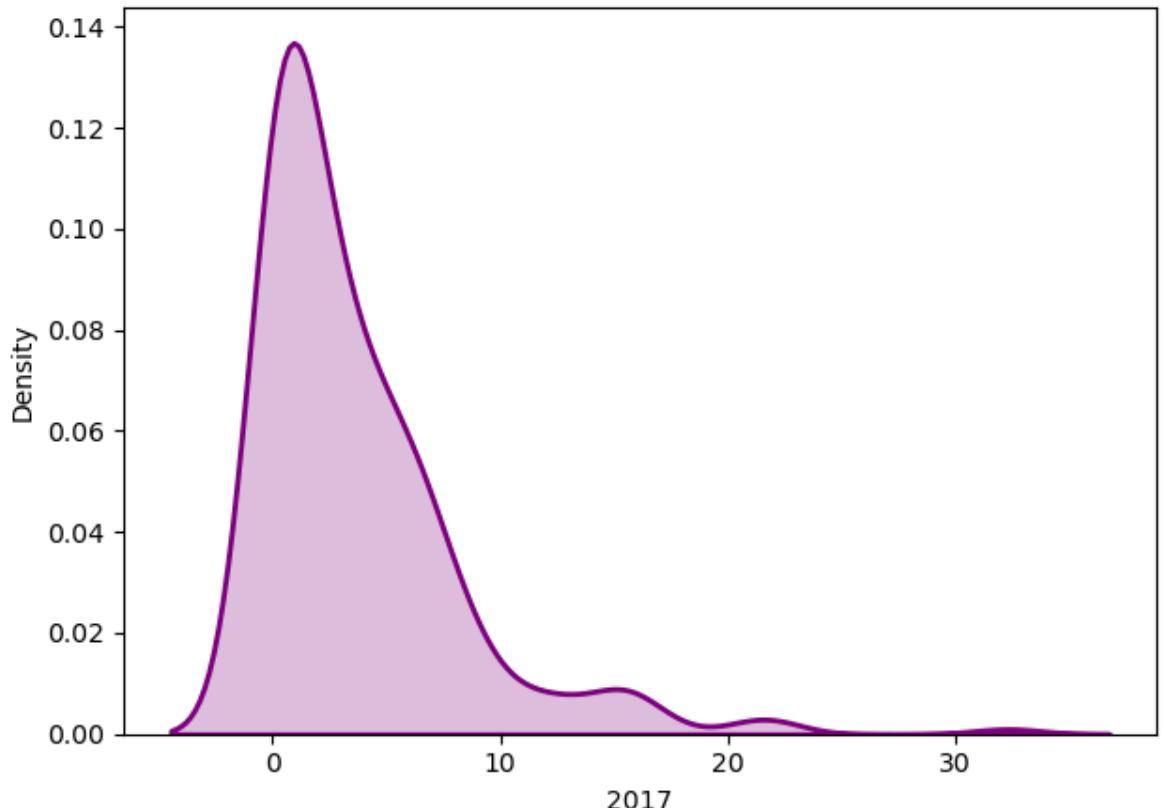
Mean of 2016: 3.6816086972825595
median of 2016: 2.317304640106628
mode of 2016: 0.0
var of 2016: 21.088801667677615
std of 2016: 4.592254529931634
max of 2016: 33.49303981669971
min of 2016: 0.0
range of 2016: 33.49303981669971

Boxplot of 2016



Percentage of outliers in 2016 is 4.90566037735849

Distribution of 2017



Skewness : 2.359785718361057

Kurtosis : 8.08056269511326

Distribution of 2017: Right skewed.

Summary Statistics:

Mean of 2017: 3.6917086469167595

median of 2017: 2.2249198938043424

mode of 2017: 0.0

var of 2017: 20.544924531681776

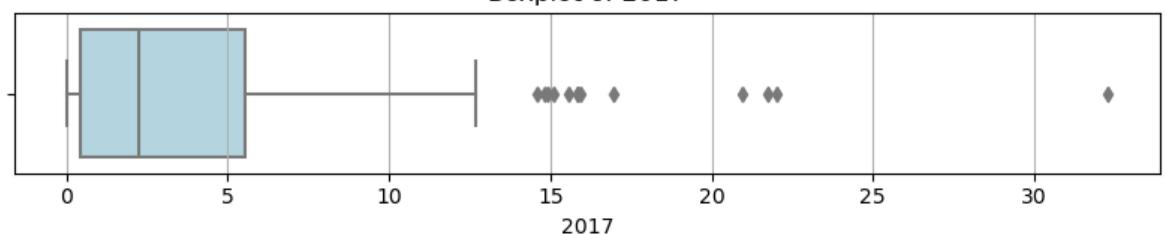
std of 2017: 4.532650938654087

max of 2017: 32.281677701535465

min of 2017: 0.0

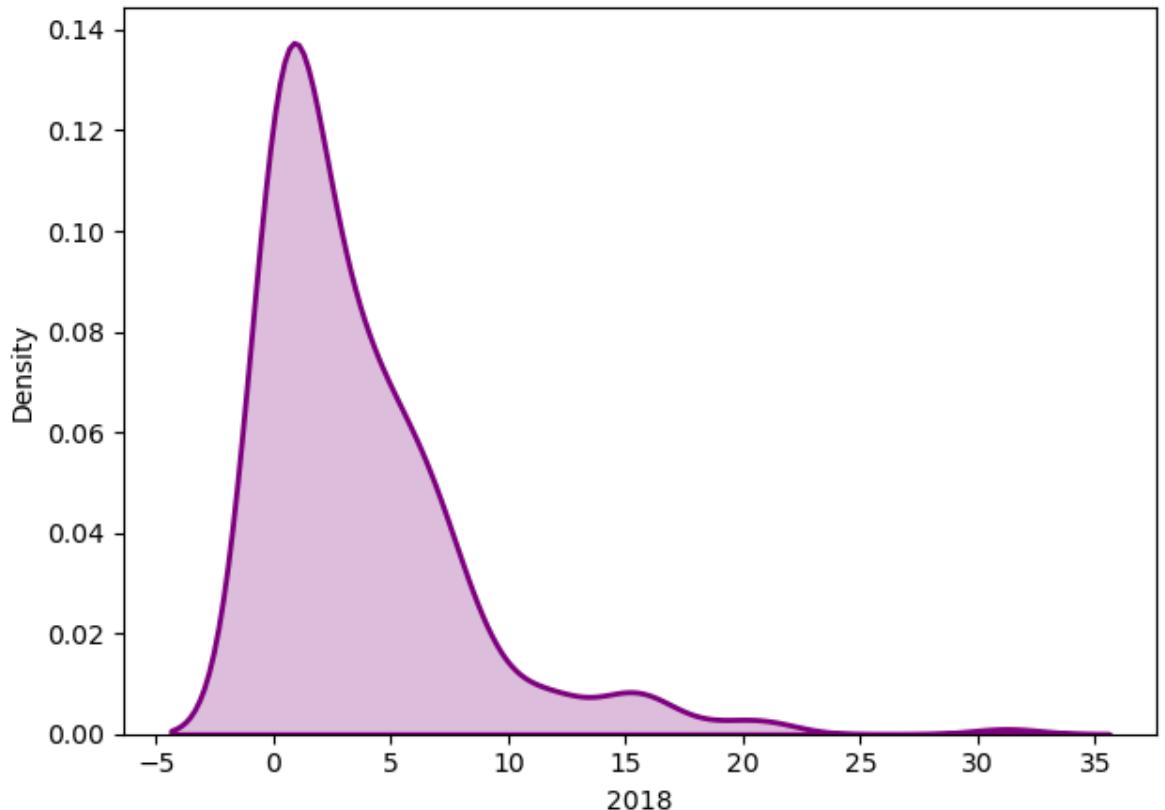
range of 2017: 32.281677701535465

Boxplot of 2017



Percentage of outliers in 2017 is 4.90566037735849

Distribution of 2018



Skewness : 2.2646793919548025

Kurtosis : 7.404488949368183

Distribution of 2018: Right skewed.

Summary Statistics:

Mean of 2018: 3.664589576024318

median of 2018: 2.3510219297071737

mode of 2018: 0.0

var of 2018: 19.781090782463636

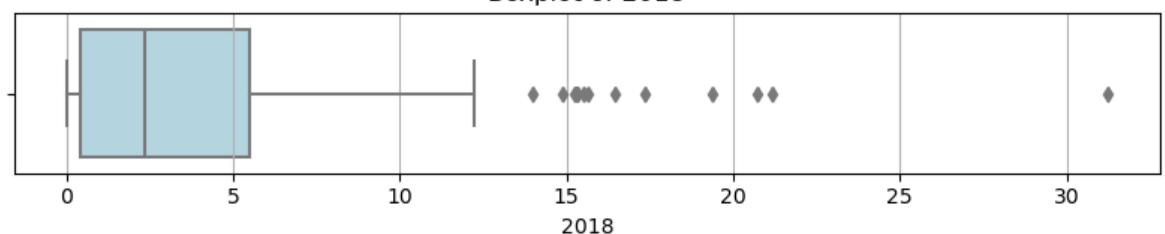
std of 2018: 4.44759381941108

max of 2018: 31.235406309301116

min of 2018: 0.0

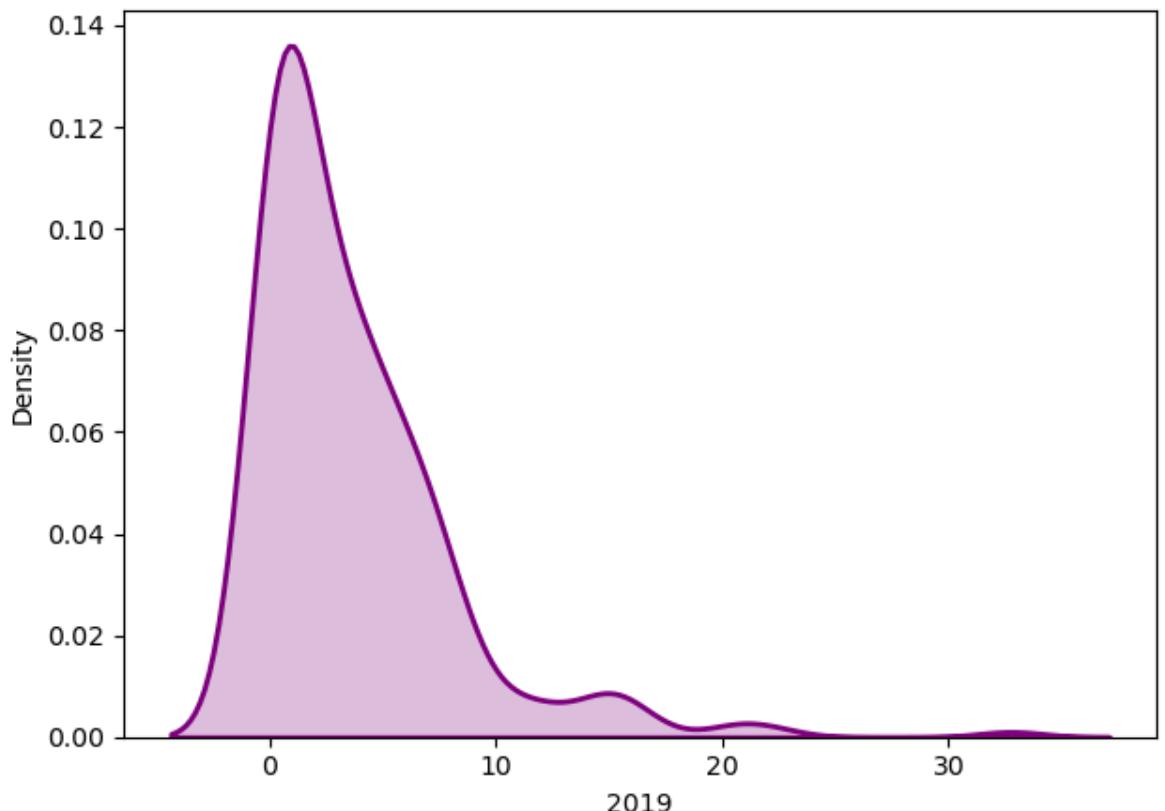
range of 2018: 31.235406309301116

Boxplot of 2018



Percentage of outliers in 2018 is 4.90566037735849

Distribution of 2019



Skewness : 2.4539494234514856

Kurtosis : 9.20053460857552

Distribution of 2019: Right skewed.

Summary Statistics:

Mean of 2019: 3.685654353267697

median of 2019: 2.3408396257331843

mode of 2019: 0.0

var of 2019: 19.533665818002135

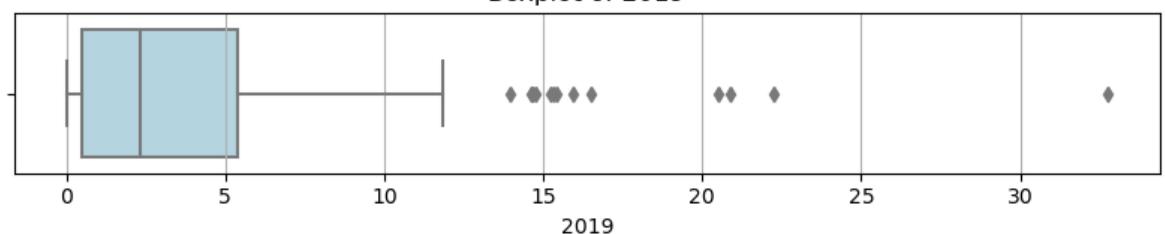
std of 2019: 4.419690692571385

max of 2019: 32.76177492112456

min of 2019: 0.0

range of 2019: 32.76177492112456

Boxplot of 2019



Percentage of outliers in 2019 is 4.90566037735849

In [47]: # Outlier Treatment

```
In [48]: for i in num:
    q1 = df[i].quantile(0.25)
    q3 = df[i].quantile(0.75)
    iqr = q3 - q1
    lf = q1-1.5*iqr
    uf = q3+1.5*iqr
    outliers = df[(df[i]<lf) | (df[i]>uf)]
    df.loc[(df[i]<lf) | (df[i]>uf), i] = df[i].median()
    outliers = df[(df[i]<lf) | (df[i]>uf)]
    print(f'Percentage of outliers in {i} is {outliers.shape[0]*100/df.shape[0]}%')
```

Percentage of outliers in 1990 is 0.0
 Percentage of outliers in 1991 is 0.0
 Percentage of outliers in 1992 is 0.0
 Percentage of outliers in 1993 is 0.0
 Percentage of outliers in 1994 is 0.0
 Percentage of outliers in 1995 is 0.0
 Percentage of outliers in 1996 is 0.0
 Percentage of outliers in 1997 is 0.0
 Percentage of outliers in 1998 is 0.0
 Percentage of outliers in 1999 is 0.0
 Percentage of outliers in 2000 is 0.0
 Percentage of outliers in 2001 is 0.0
 Percentage of outliers in 2002 is 0.0
 Percentage of outliers in 2003 is 0.0
 Percentage of outliers in 2004 is 0.0
 Percentage of outliers in 2005 is 0.0
 Percentage of outliers in 2006 is 0.0
 Percentage of outliers in 2007 is 0.0
 Percentage of outliers in 2008 is 0.0
 Percentage of outliers in 2009 is 0.0
 Percentage of outliers in 2010 is 0.0
 Percentage of outliers in 2011 is 0.0
 Percentage of outliers in 2012 is 0.0
 Percentage of outliers in 2013 is 0.0
 Percentage of outliers in 2014 is 0.0
 Percentage of outliers in 2015 is 0.0
 Percentage of outliers in 2016 is 0.0
 Percentage of outliers in 2017 is 0.0
 Percentage of outliers in 2018 is 0.0
 Percentage of outliers in 2019 is 0.0

Bivariate Analysis

Cat-Cat Analysis

In [49]: cat

Out[49]: ['region', 'incomegroup']

```
In [50]: ct = pd.crosstab(df['region'], df['incomegroup'])
```

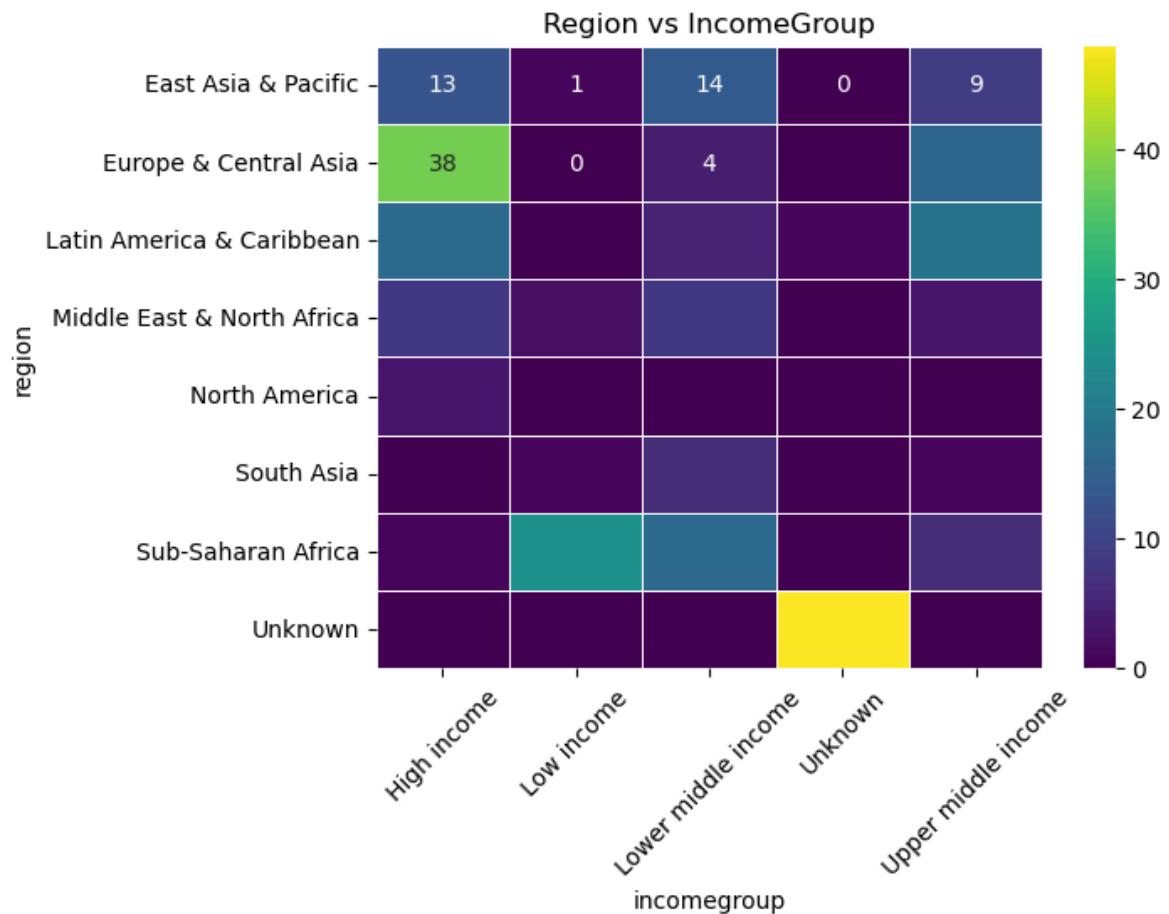
```
In [51]: from scipy import stats
```

```
chi2, p, dof, expected = stats.chi2_contingency(ct)
print(f'chi-square: {chi2:.2f}, p-value: {p:.4f}')
if p < 0.05:
    print(f'there is significant association between region and incomegroup')
else:
    print(f'there is no significant association between region and incomegroup')
```

chi-square: 429.87, p-value: 0.0000

there is significant association between region and incomegroup

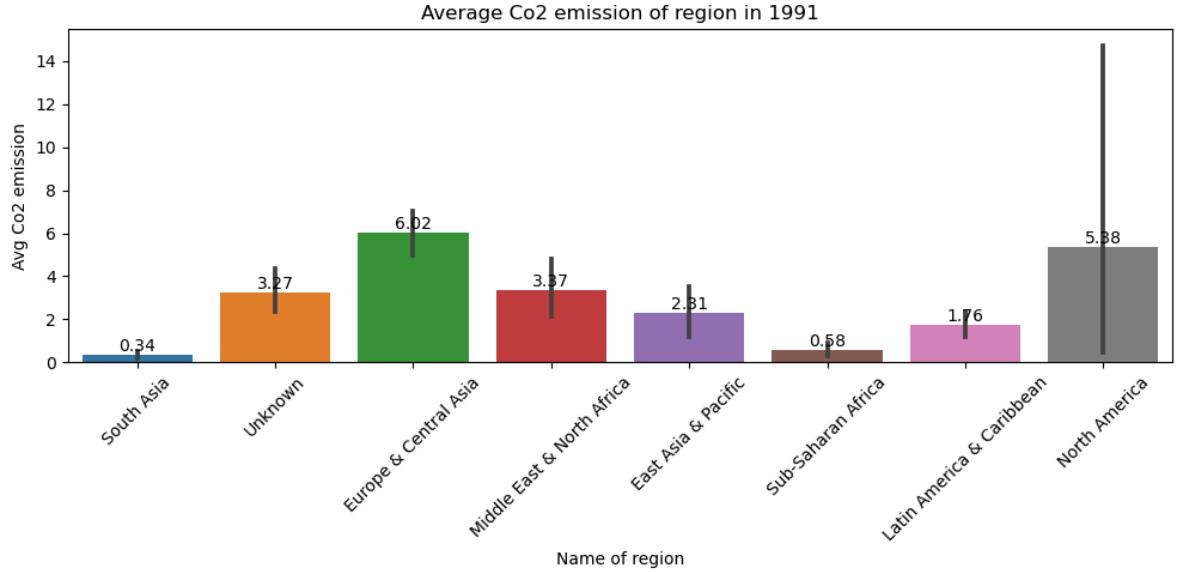
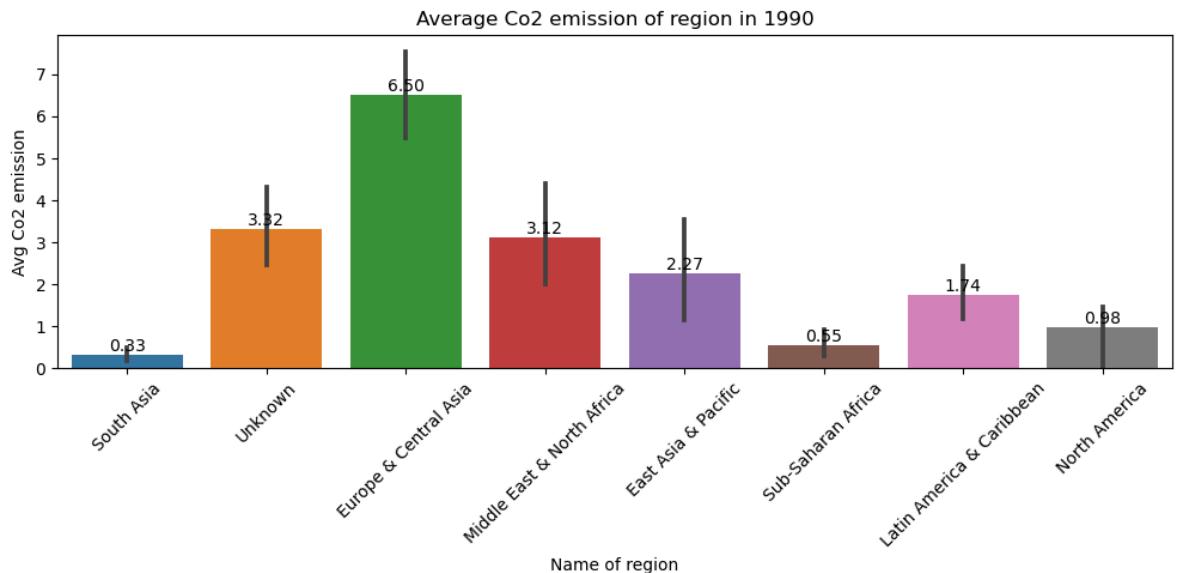
```
In [52]: sns.heatmap(ct, annot=True, fmt='d', cmap='viridis', linewidths = 0.5)
plt.title('Region vs IncomeGroup')
plt.xticks(rotation=45)
plt.show()
```



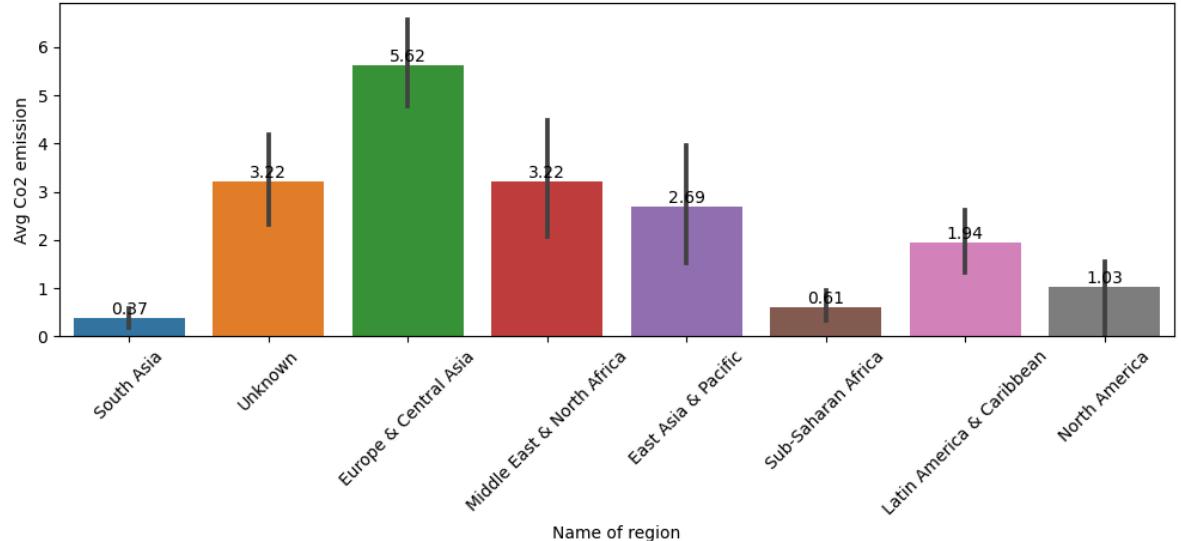
Cat-Num Analysis

```
In [53]: # For each year
```

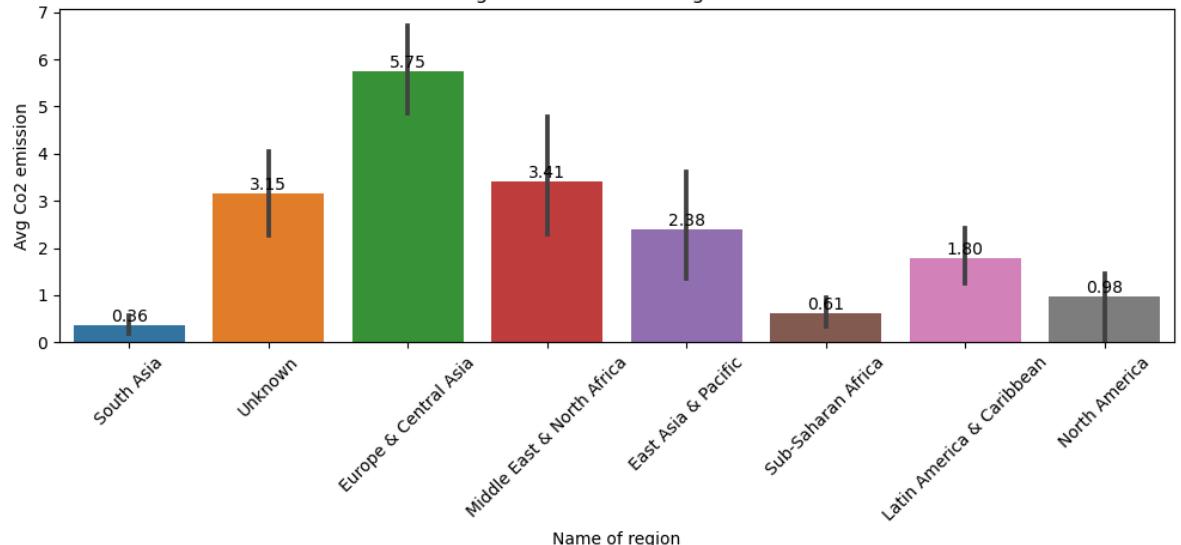
```
In [54]: for i in cat:
    for j in num:
        plt.figure(figsize = (10,5))
        ax = sns.barplot(x = i, y = j, data = df)
        ax.bar_label(ax.containers[0], fmt = '%.2f')
        plt.title(f'Average Co2 emission of {i} in {j}')
        plt.xlabel(f'Name of {i}')
        plt.ylabel(f'Avg Co2 emission')
        plt.xticks(rotation = 45)
        plt.tight_layout()
        plt.show()
```



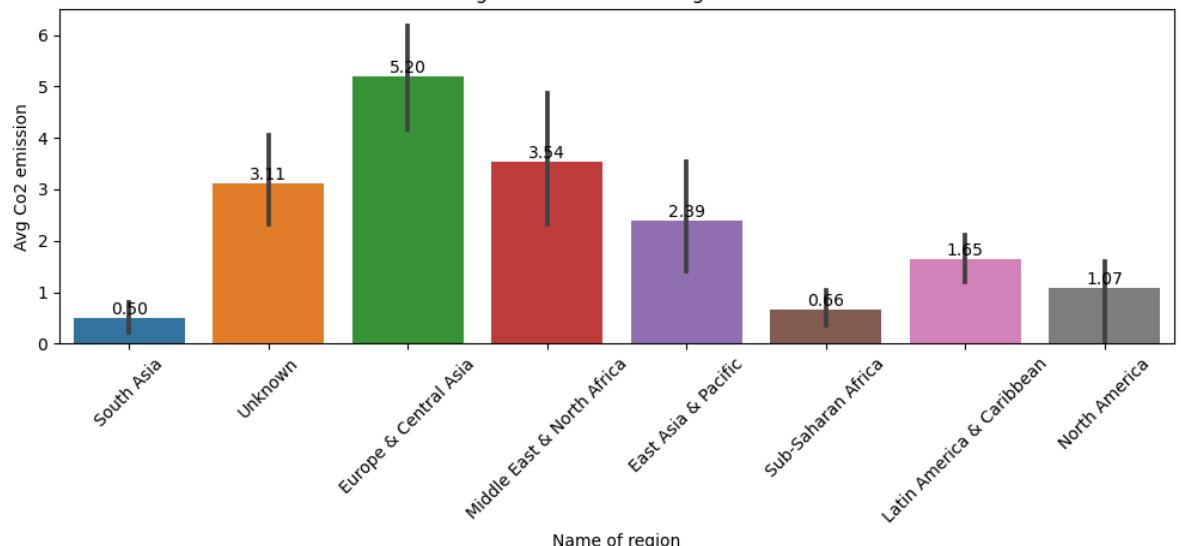
Average Co2 emission of region in 1992



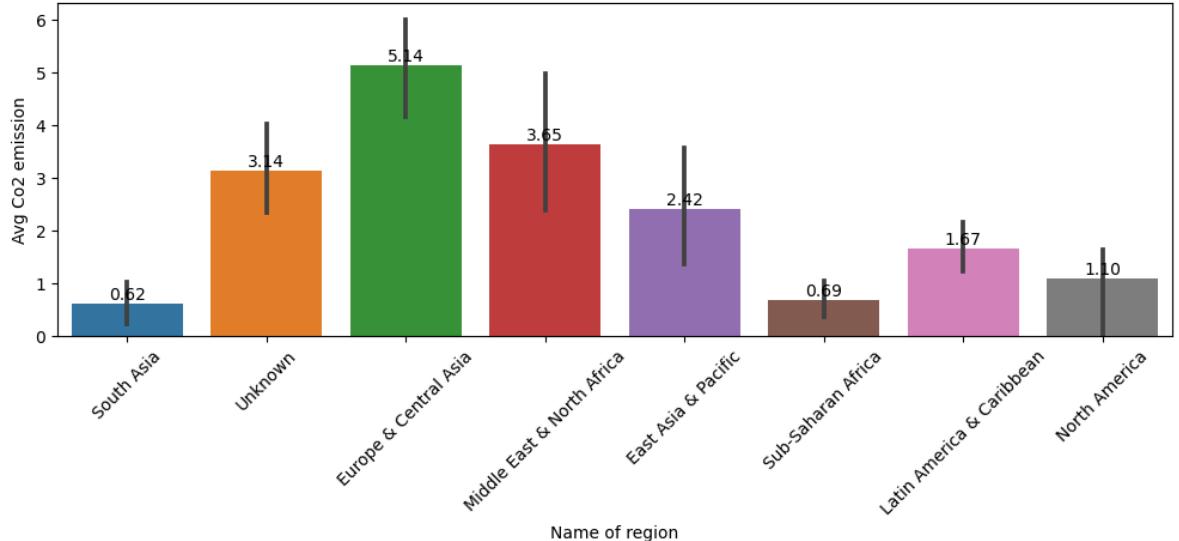
Average Co2 emission of region in 1993



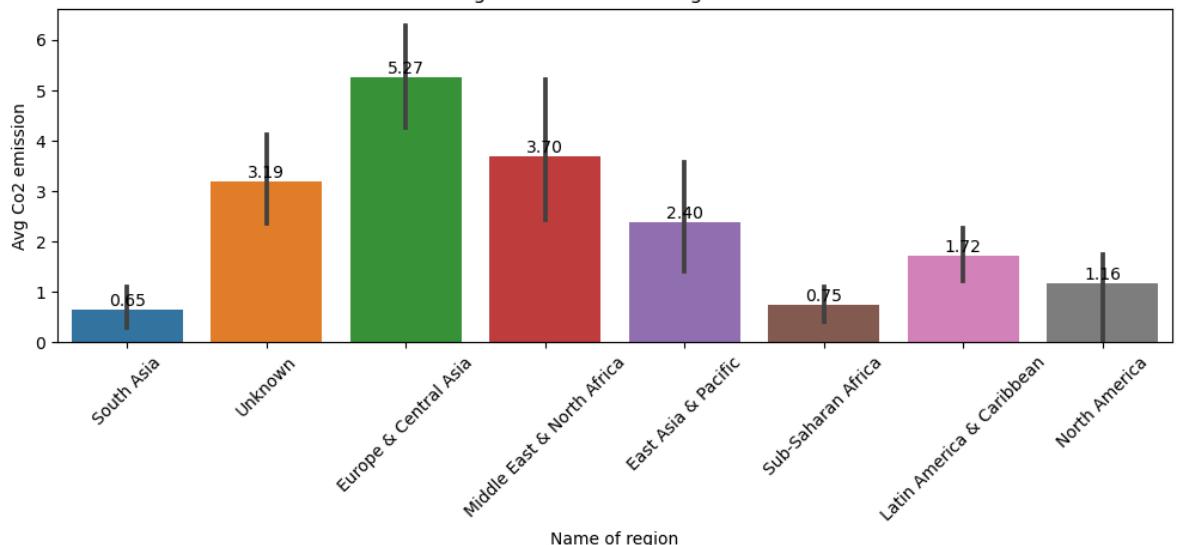
Average Co2 emission of region in 1994



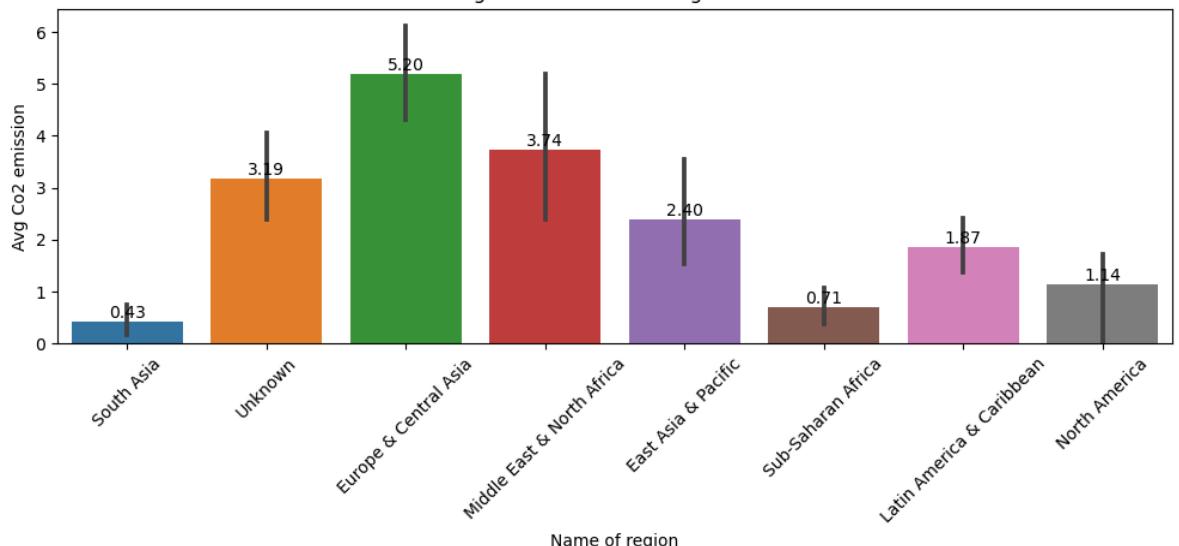
Average Co2 emission of region in 1995



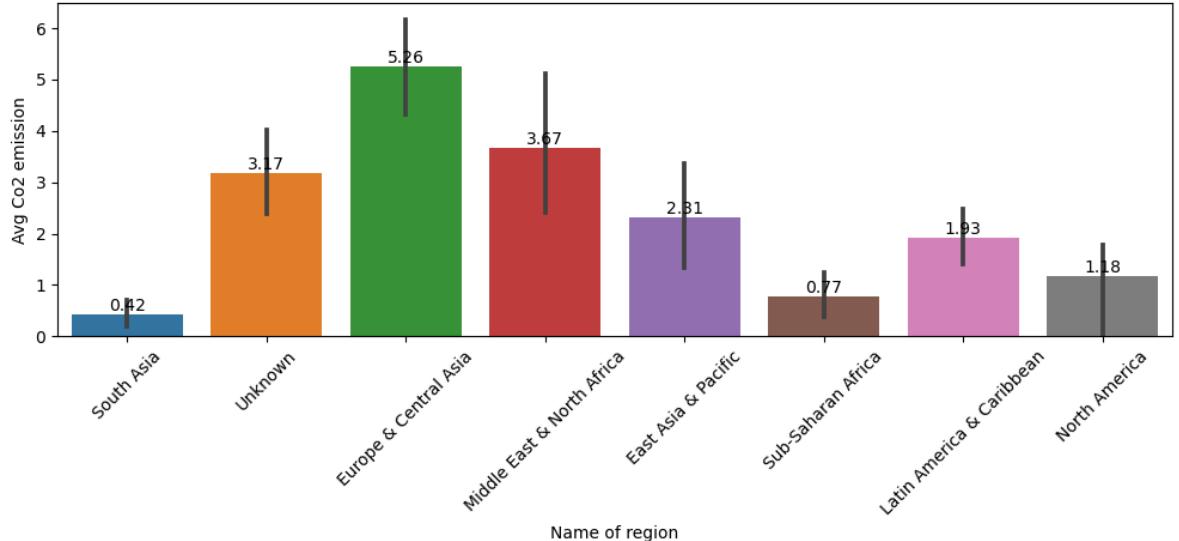
Average Co2 emission of region in 1996



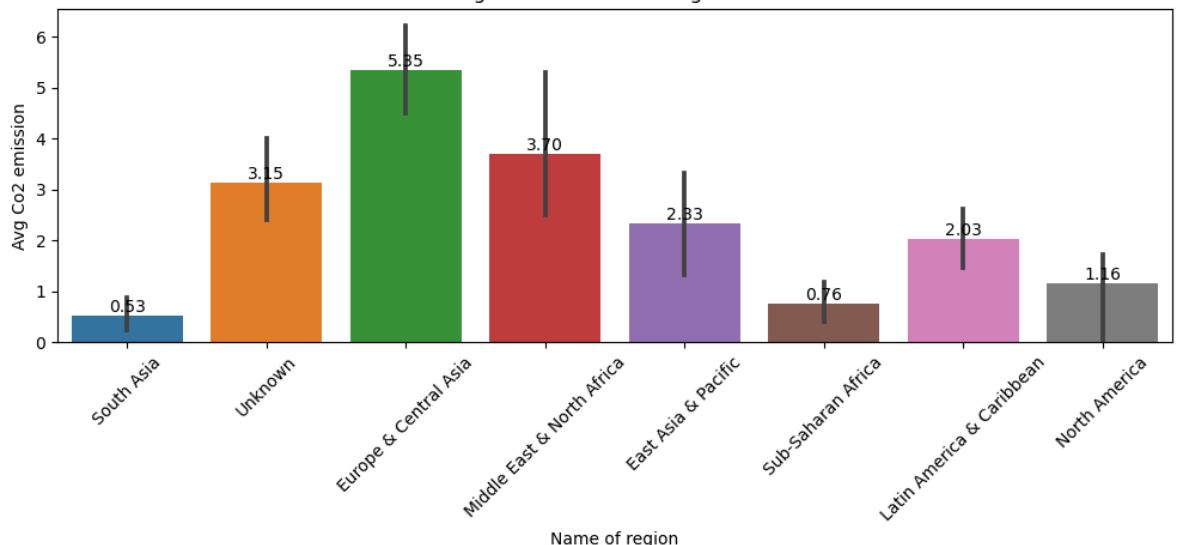
Average Co2 emission of region in 1997



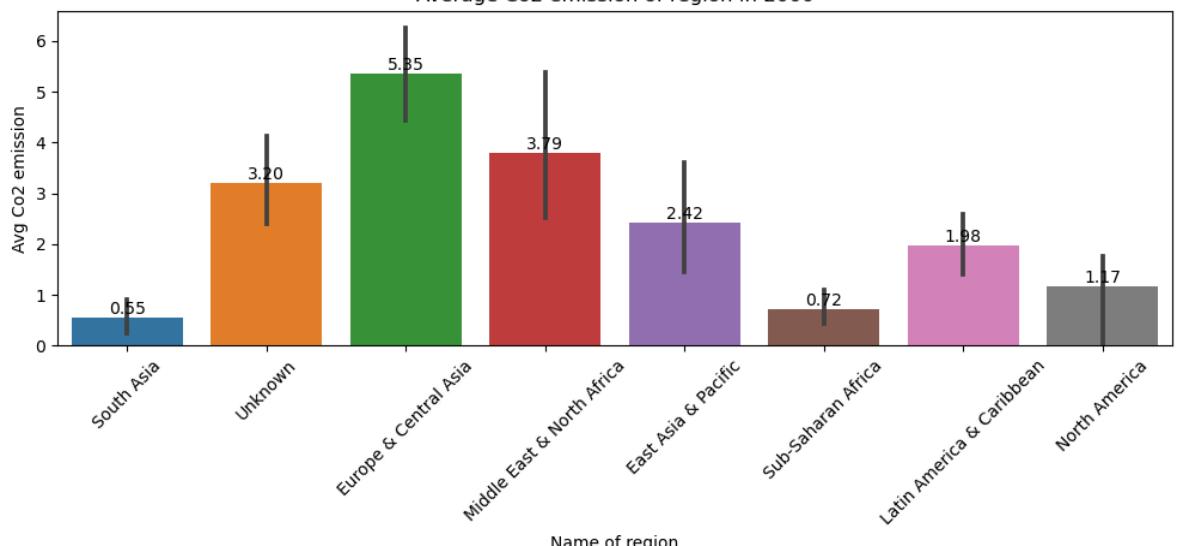
Average Co2 emission of region in 1998



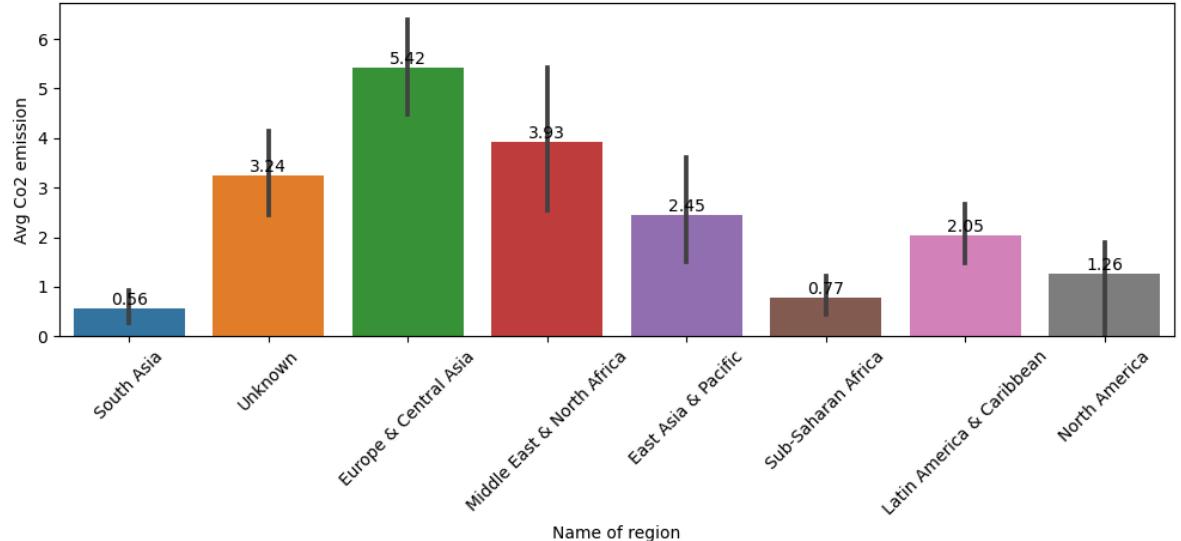
Average Co2 emission of region in 1999



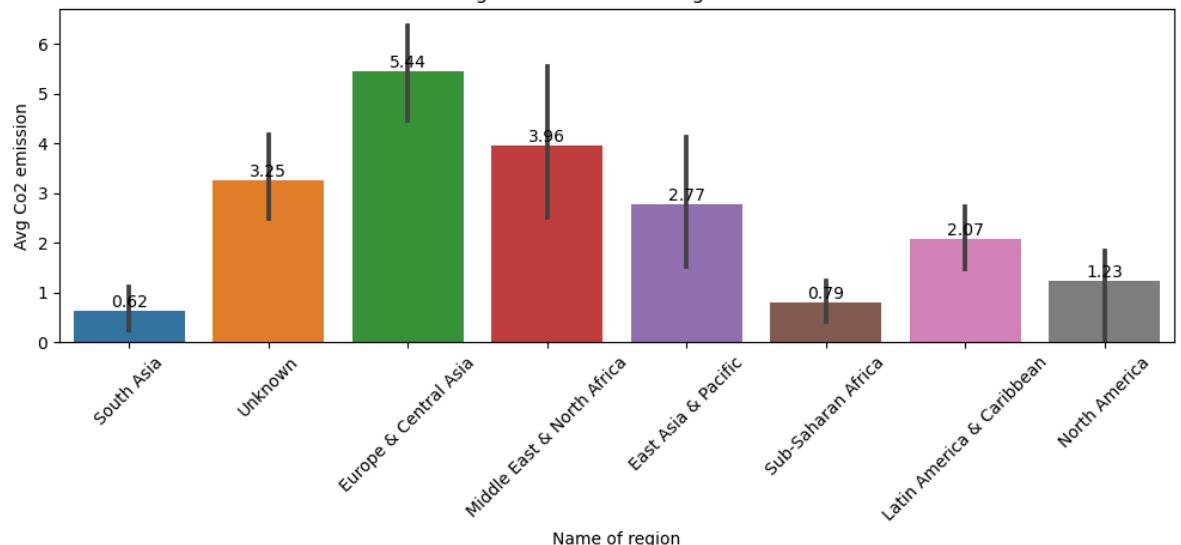
Average Co2 emission of region in 2000



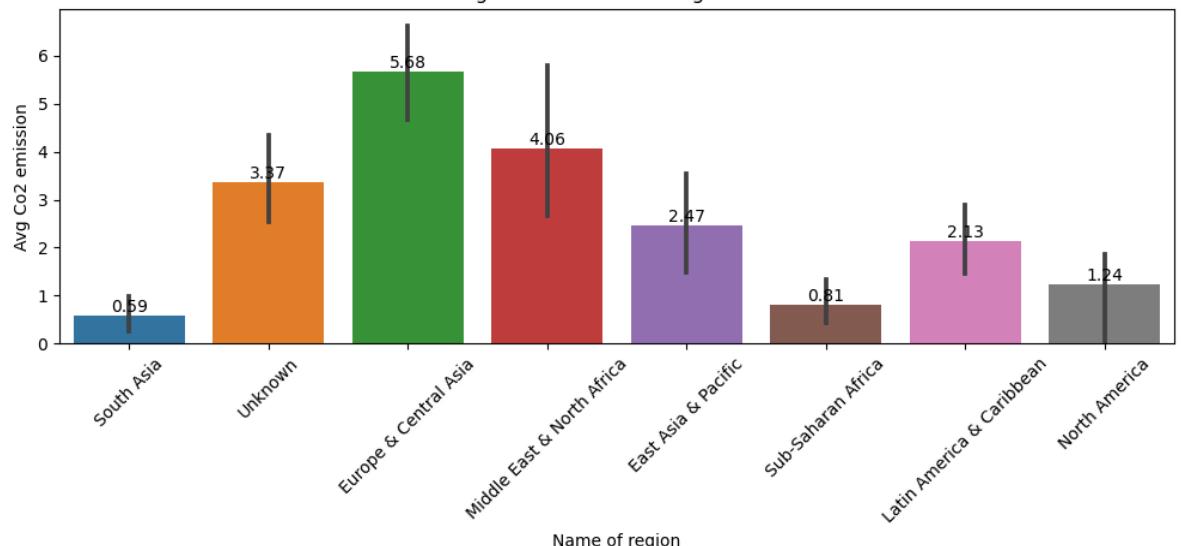
Average Co2 emission of region in 2001

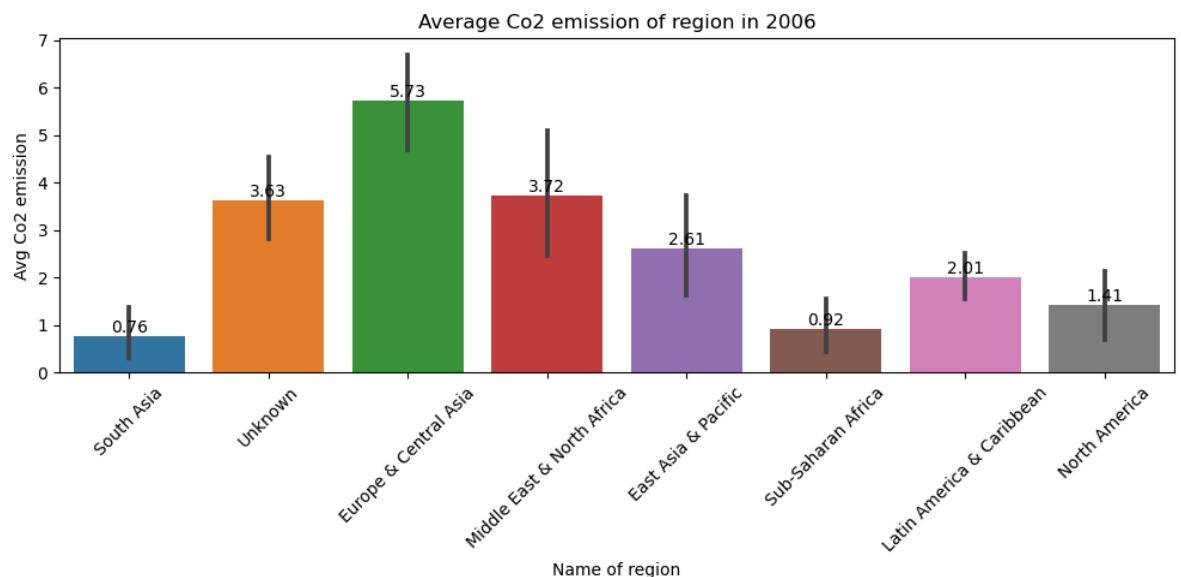
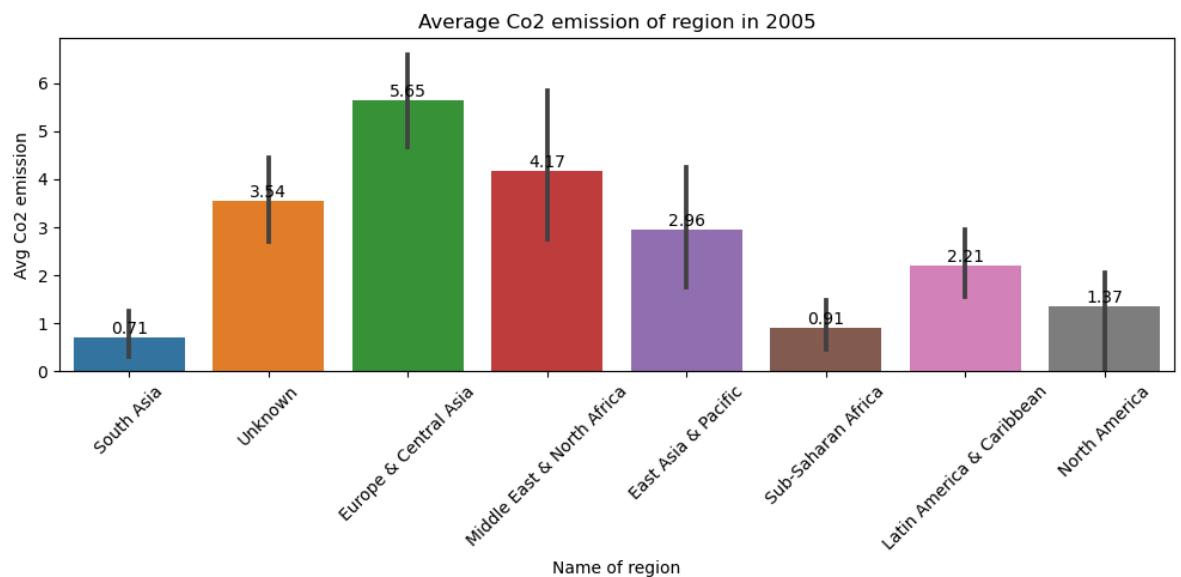
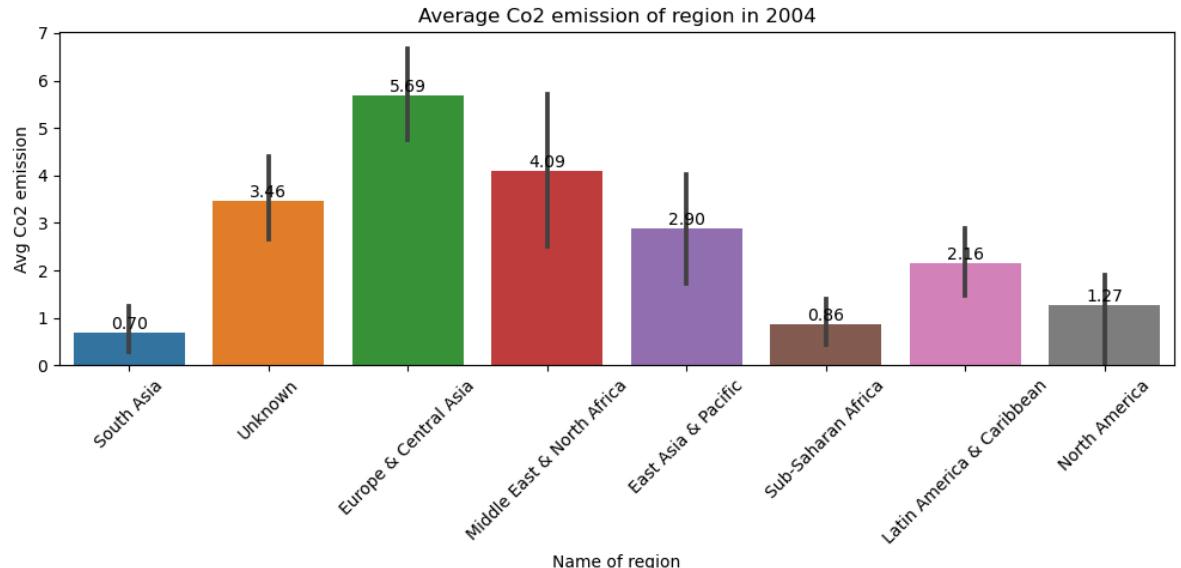


Average Co2 emission of region in 2002

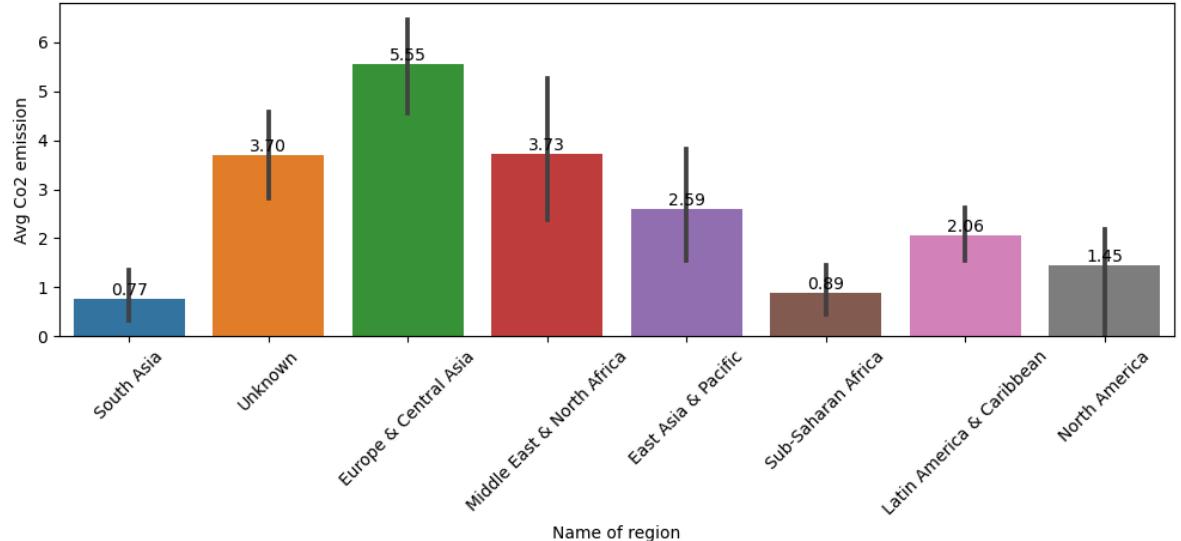


Average Co2 emission of region in 2003

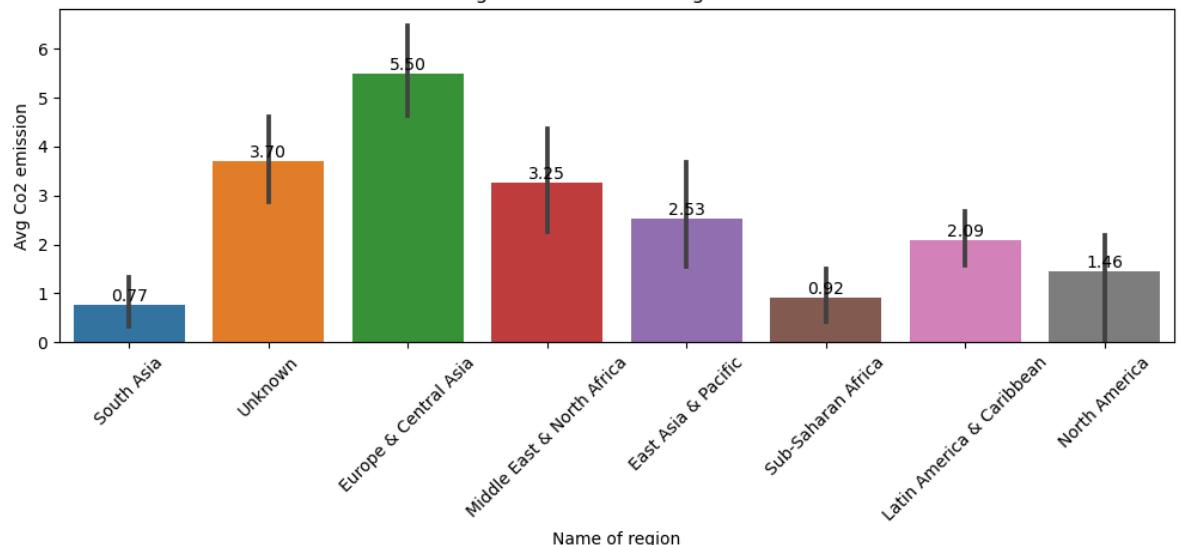




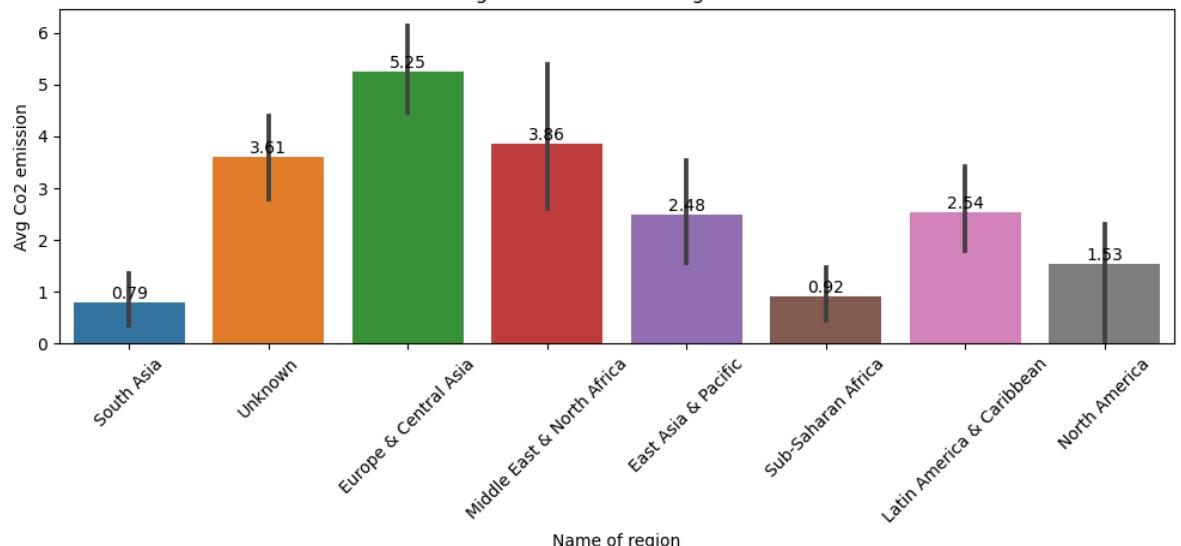
Average Co2 emission of region in 2007



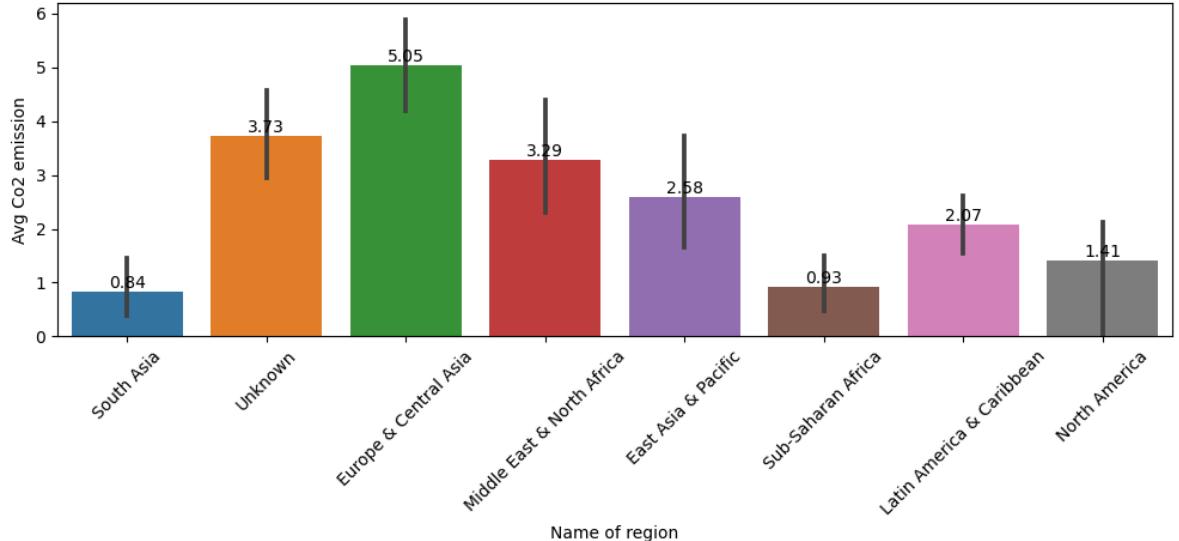
Average Co2 emission of region in 2008



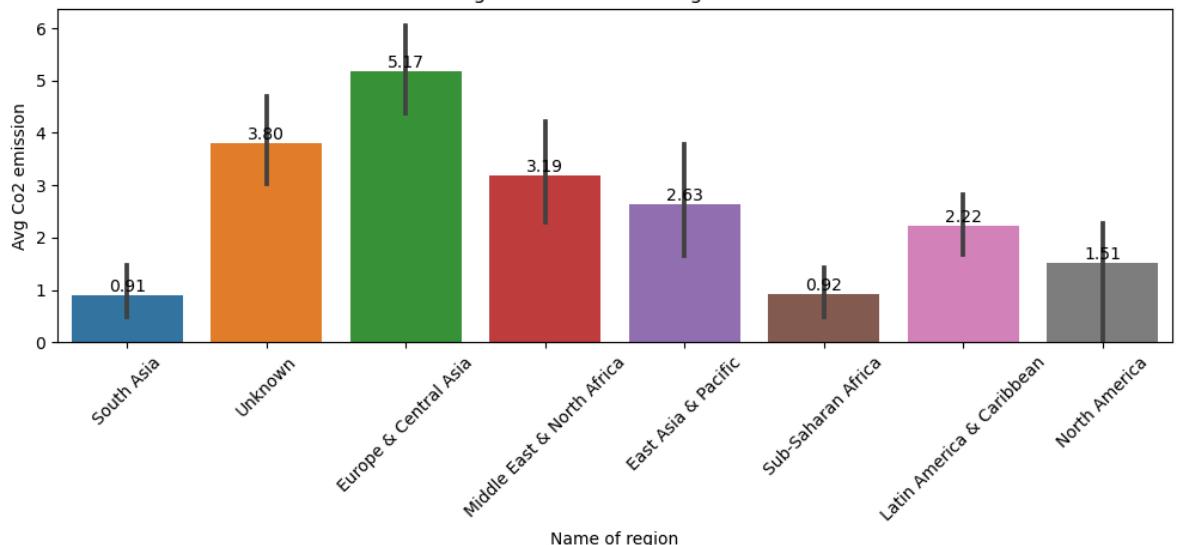
Average Co2 emission of region in 2009



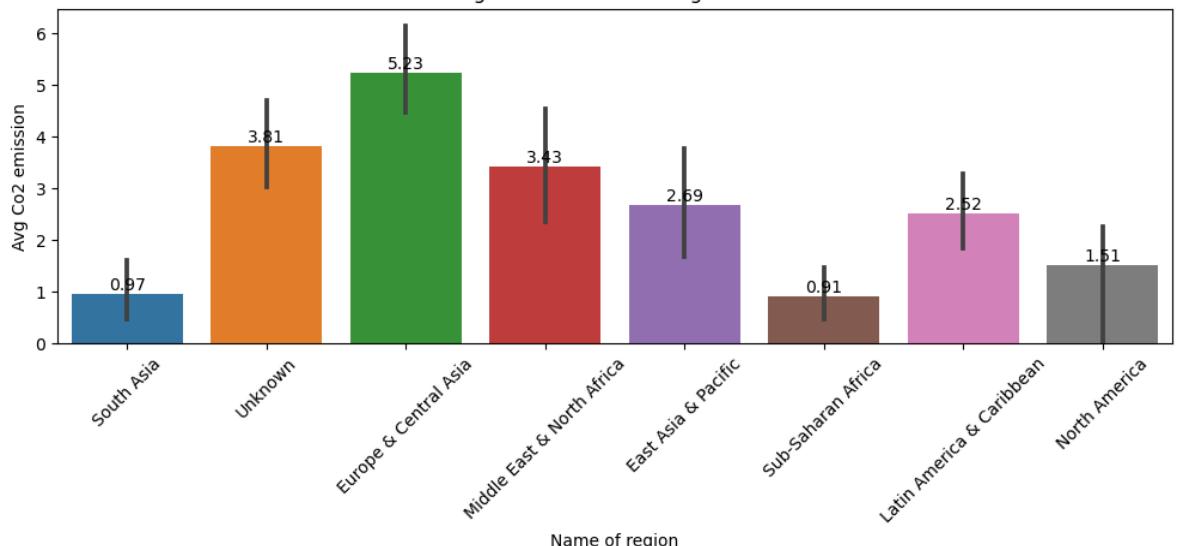
Average Co2 emission of region in 2010



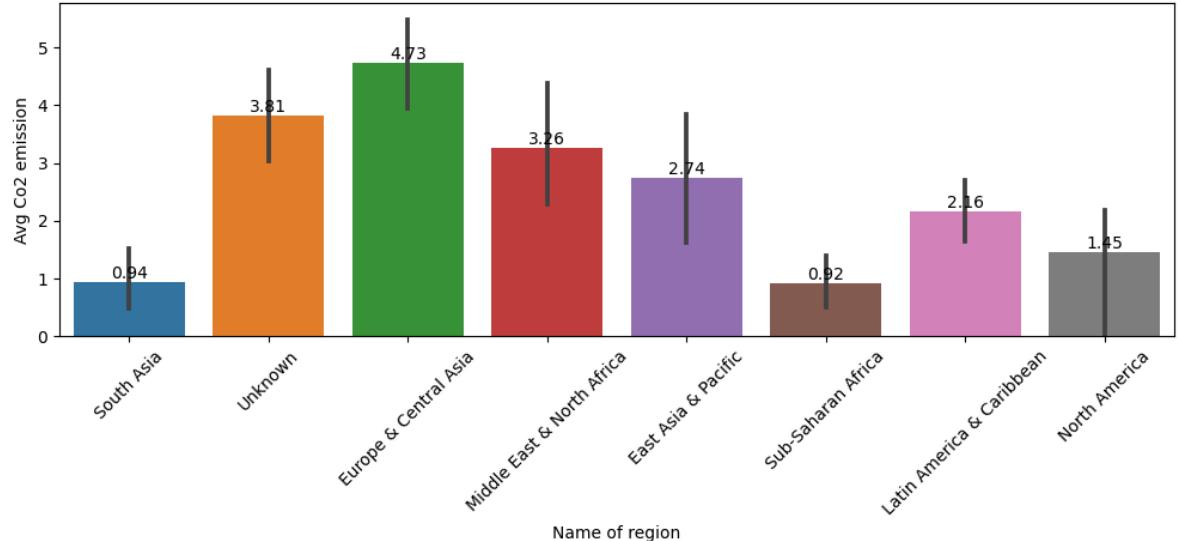
Average Co2 emission of region in 2011



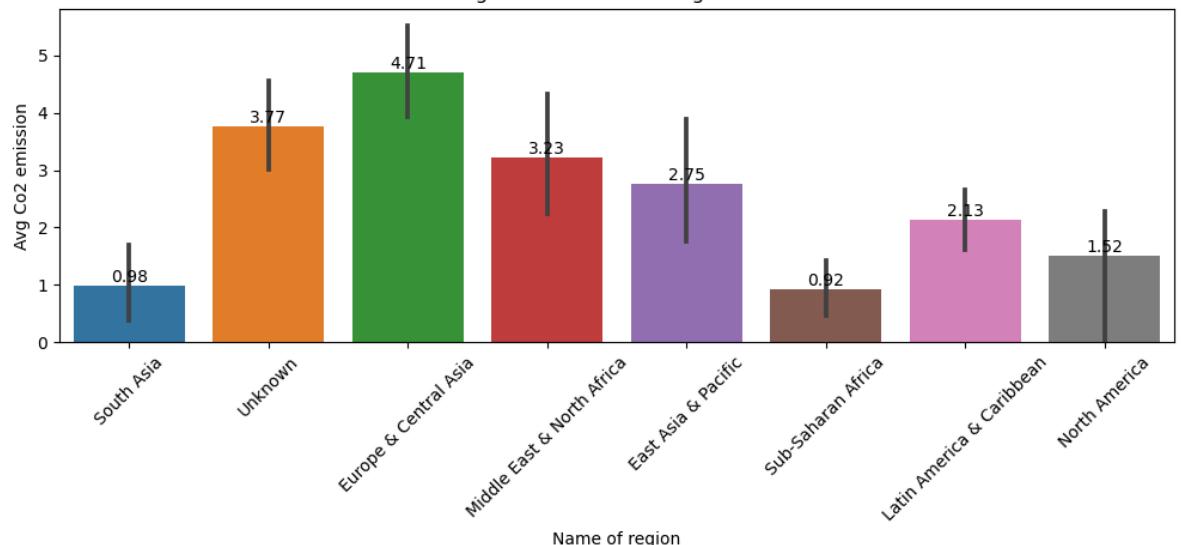
Average Co2 emission of region in 2012



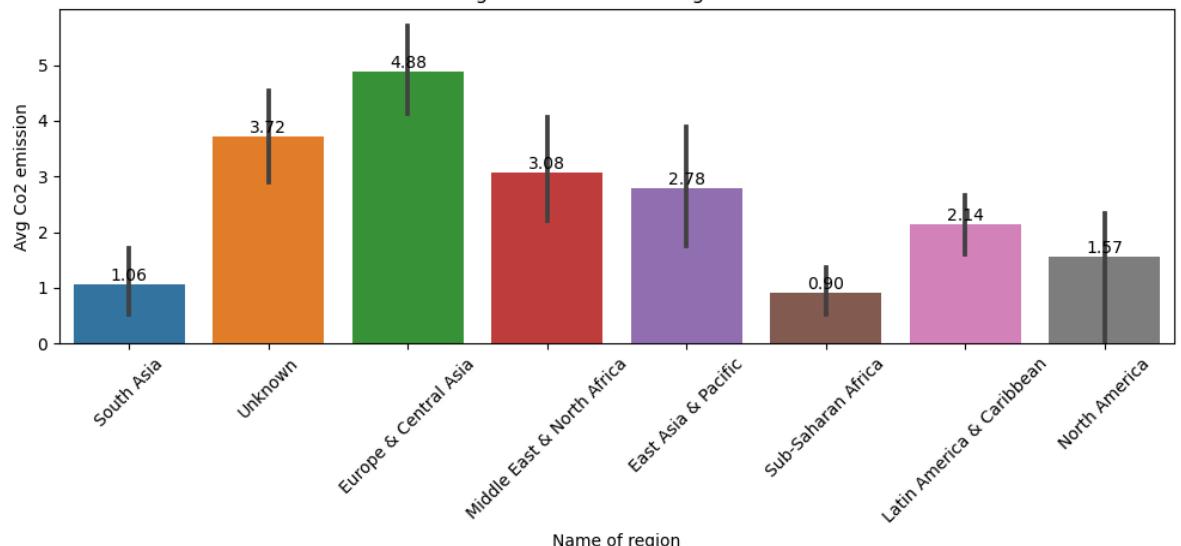
Average Co2 emission of region in 2013



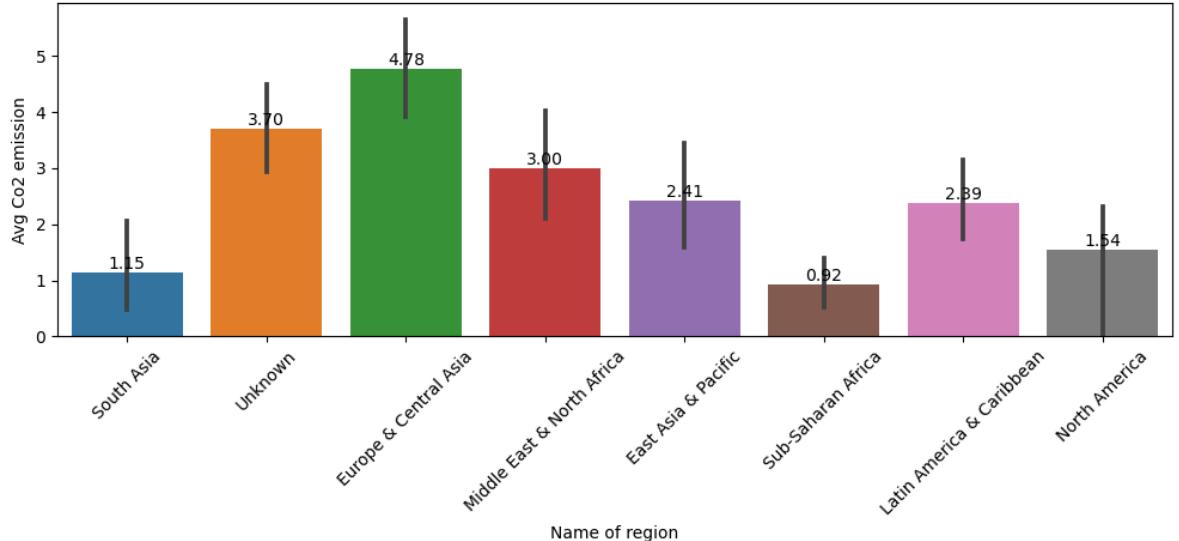
Average Co2 emission of region in 2014



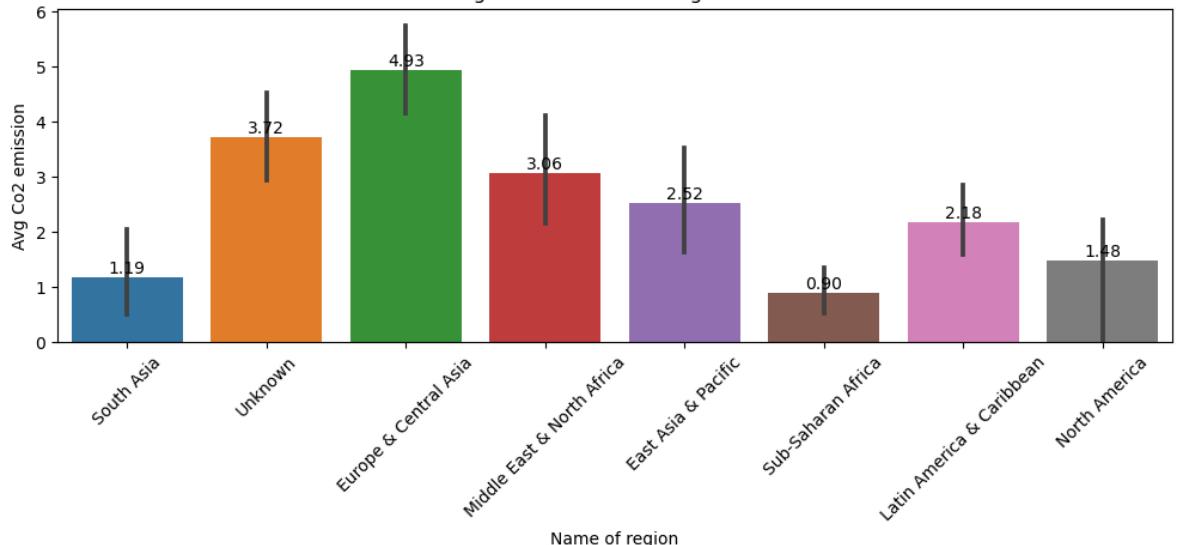
Average Co2 emission of region in 2015



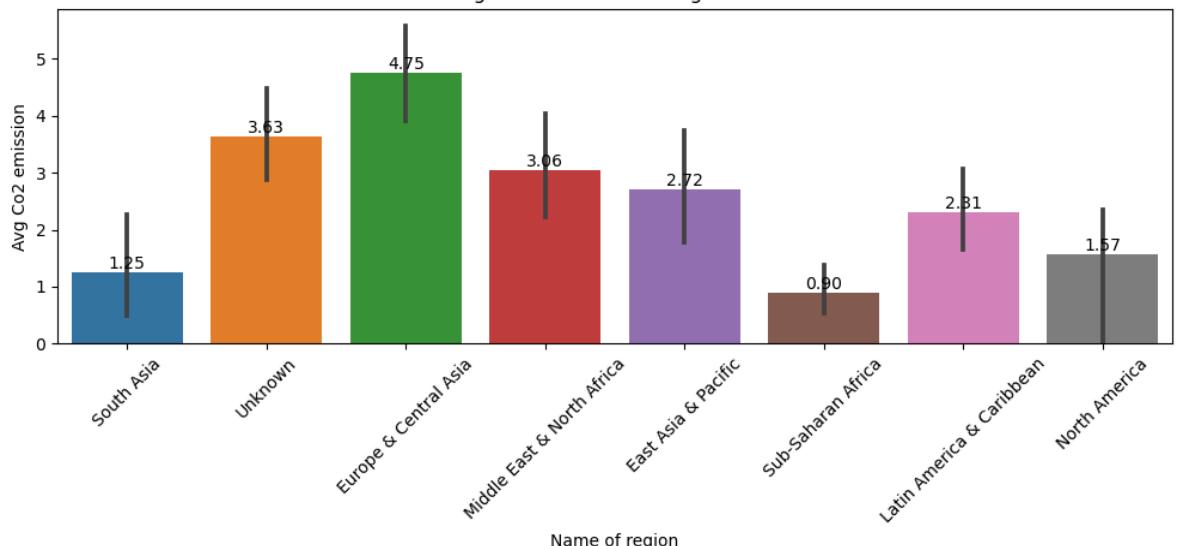
Average Co2 emission of region in 2016



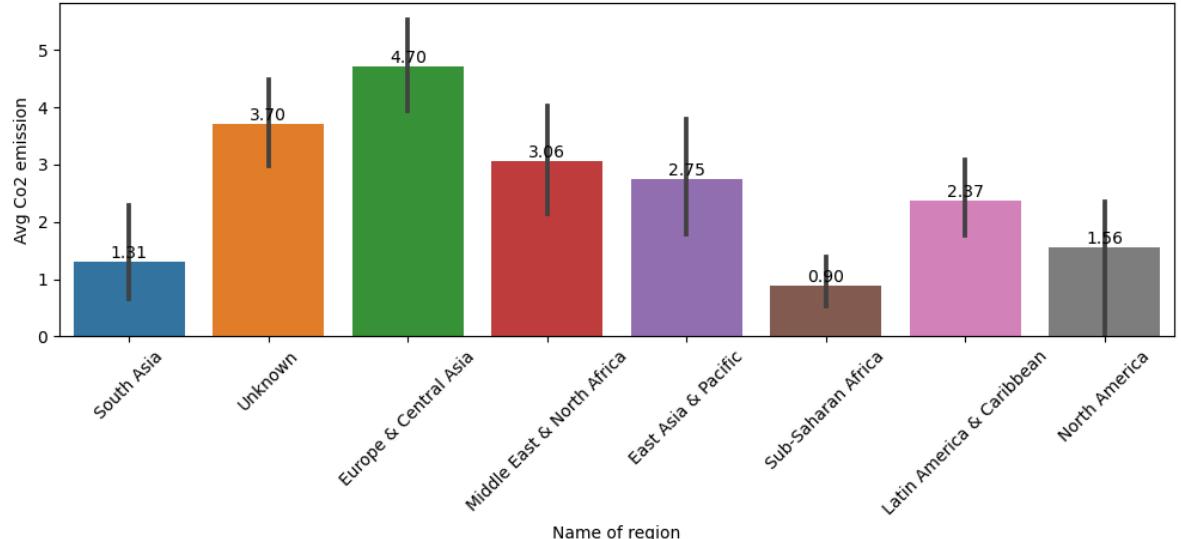
Average Co2 emission of region in 2017



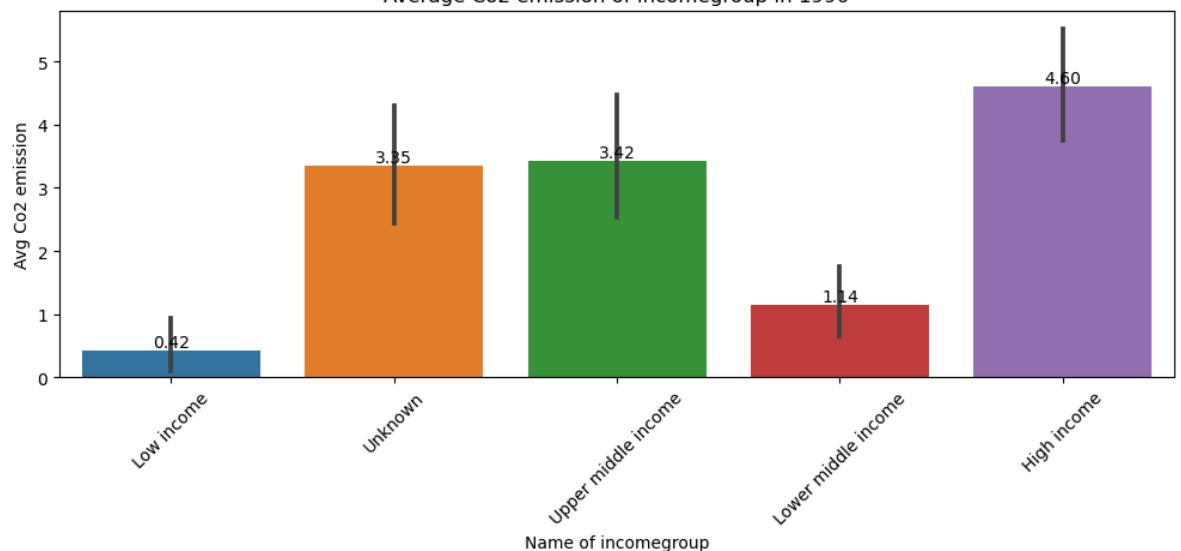
Average Co2 emission of region in 2018



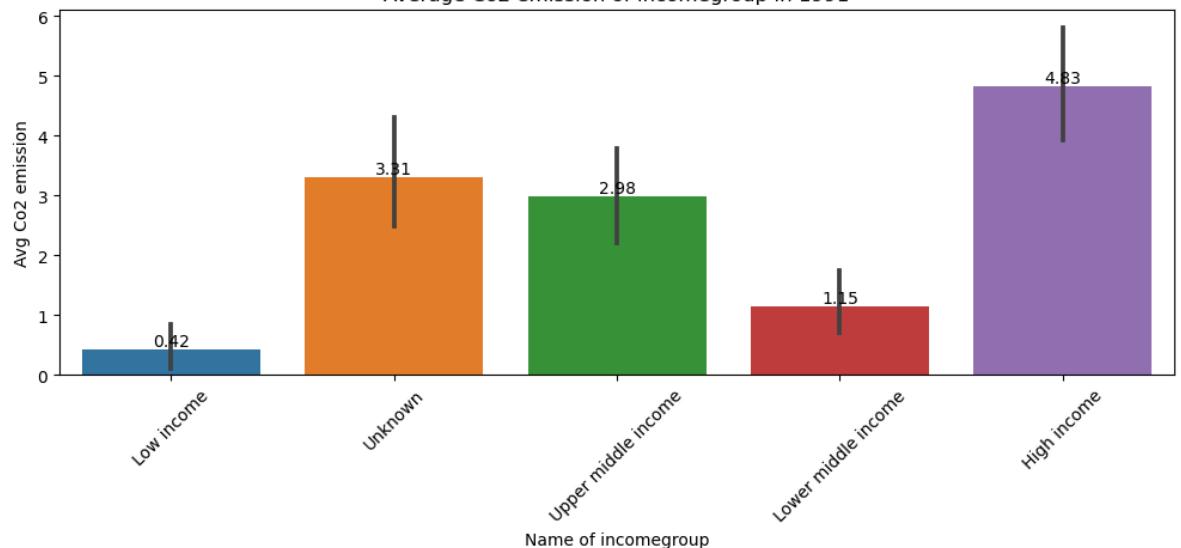
Average Co2 emission of region in 2019



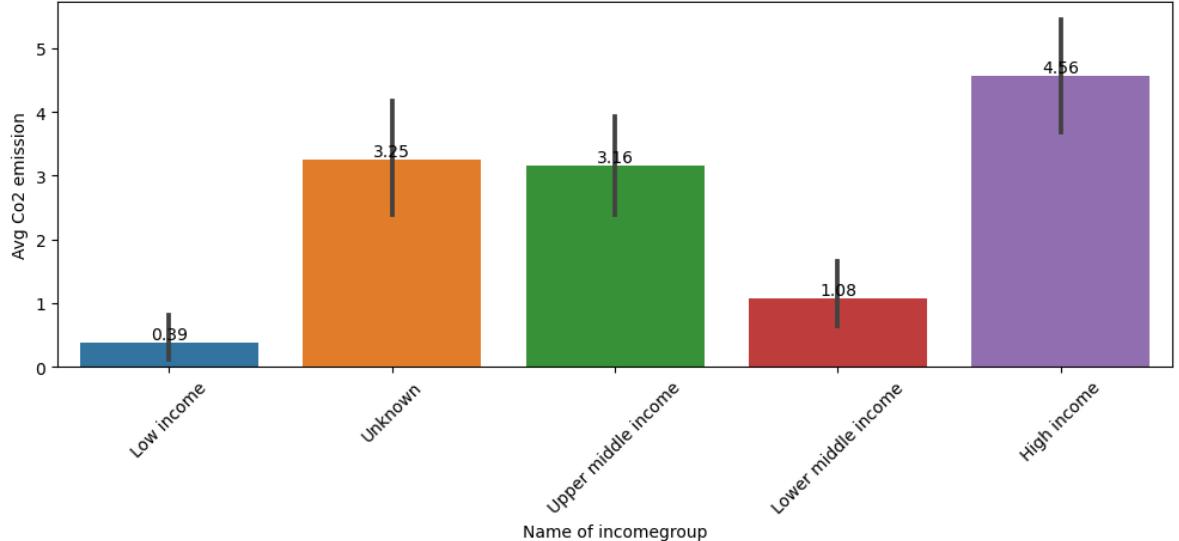
Average Co2 emission of incomegroup in 1990



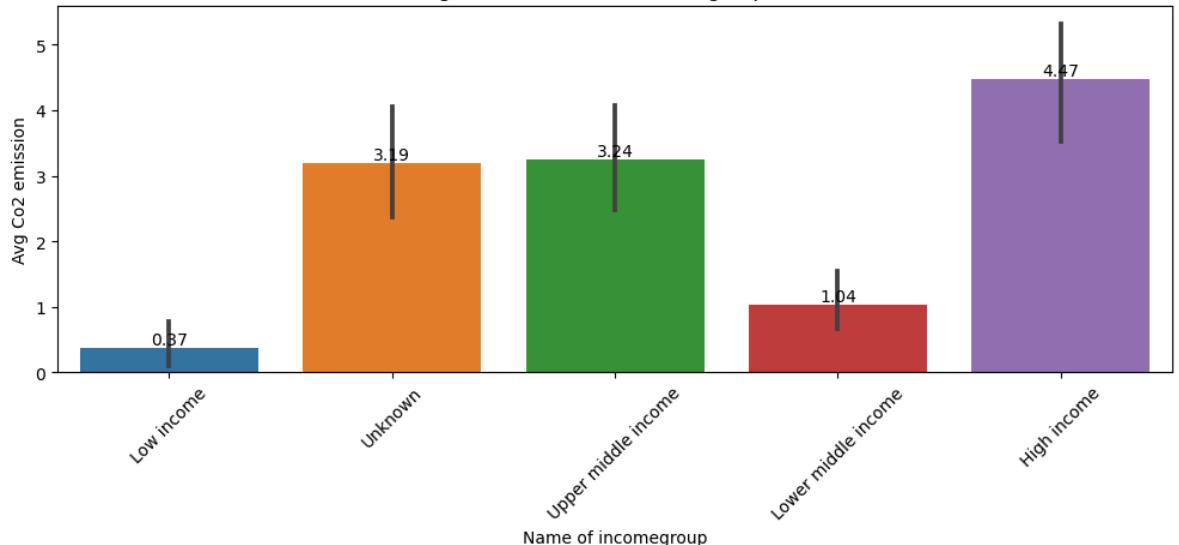
Average Co2 emission of incomegroup in 1991



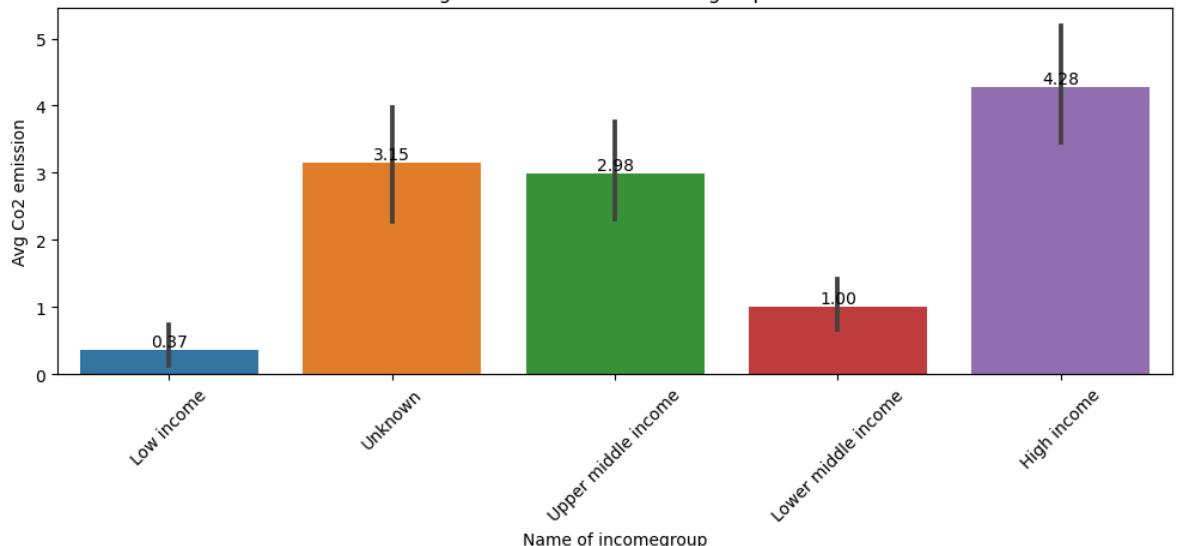
Average Co2 emission of incomegroup in 1992



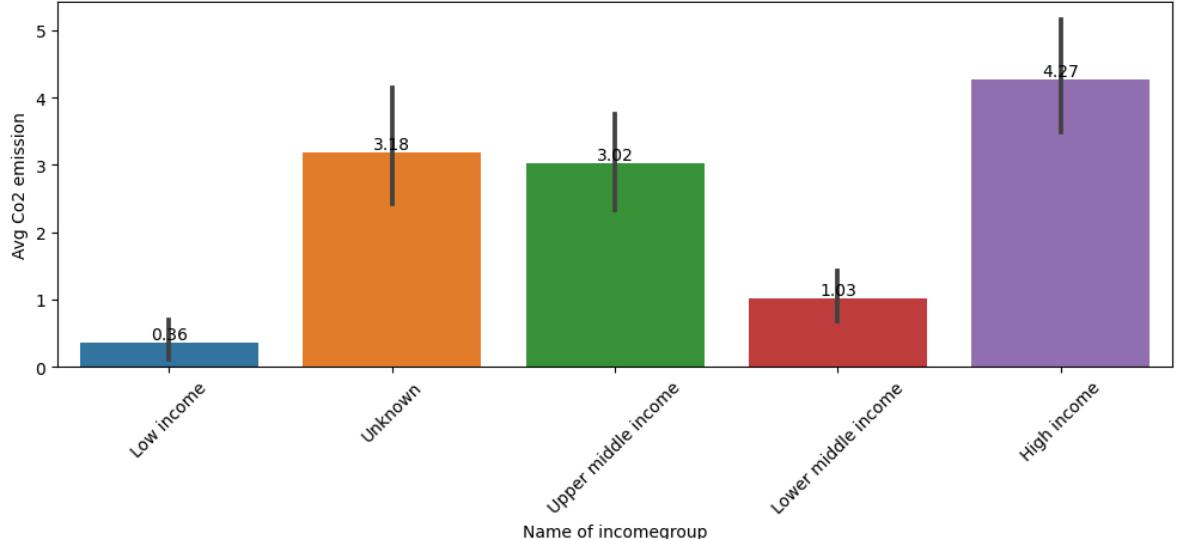
Average Co2 emission of incomegroup in 1993



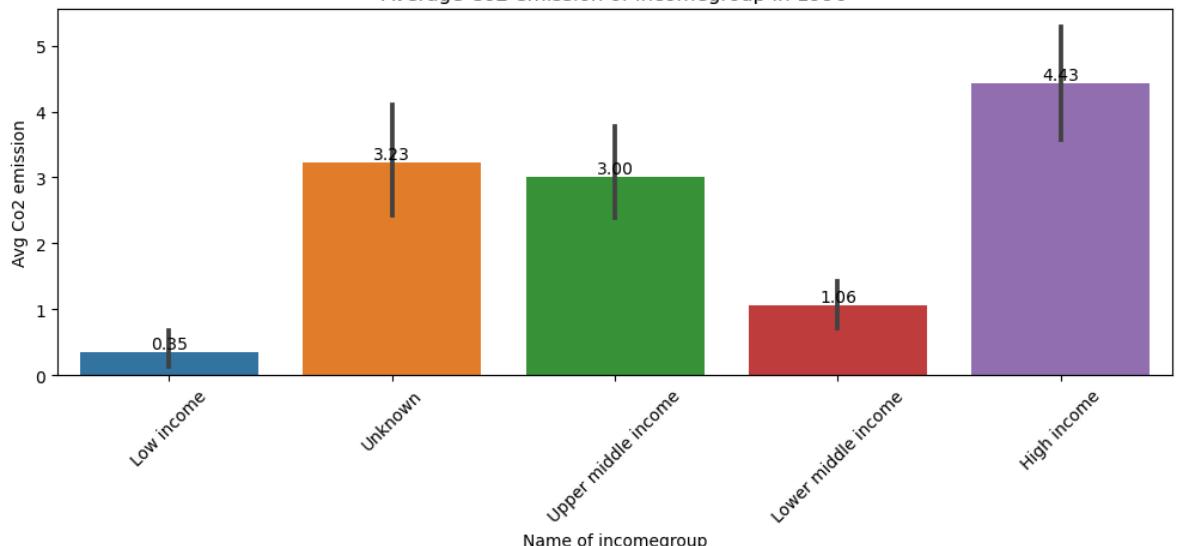
Average Co2 emission of incomegroup in 1994



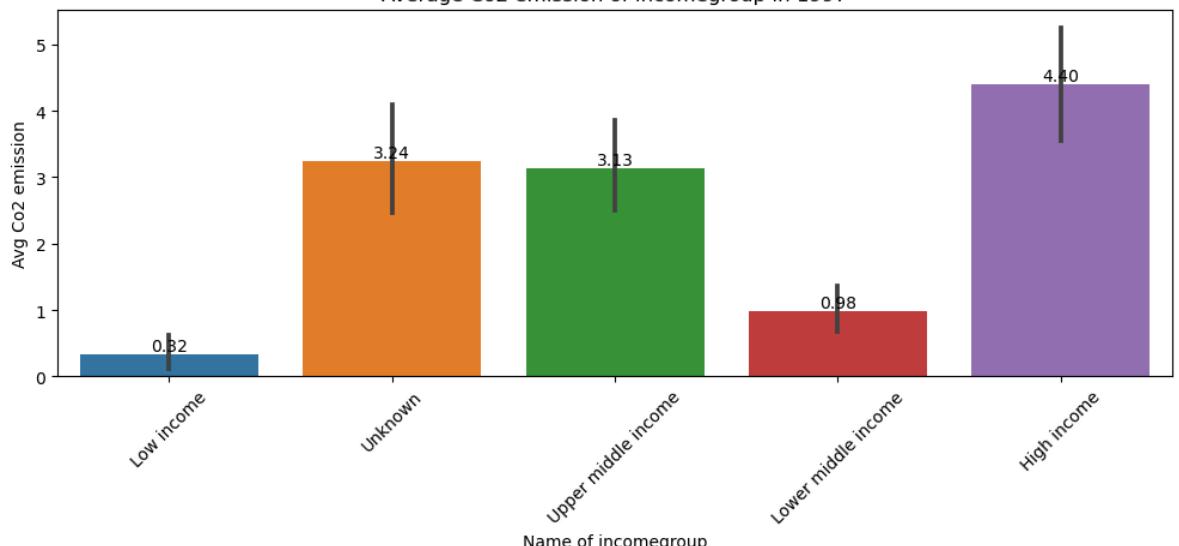
Average Co2 emission of incomegroup in 1995



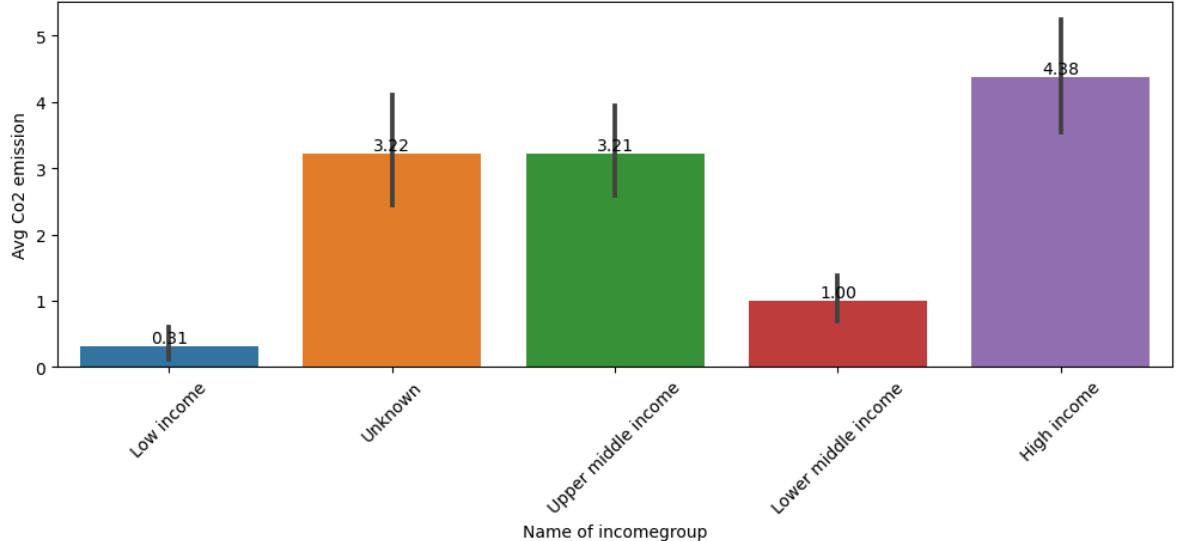
Average Co2 emission of incomegroup in 1996



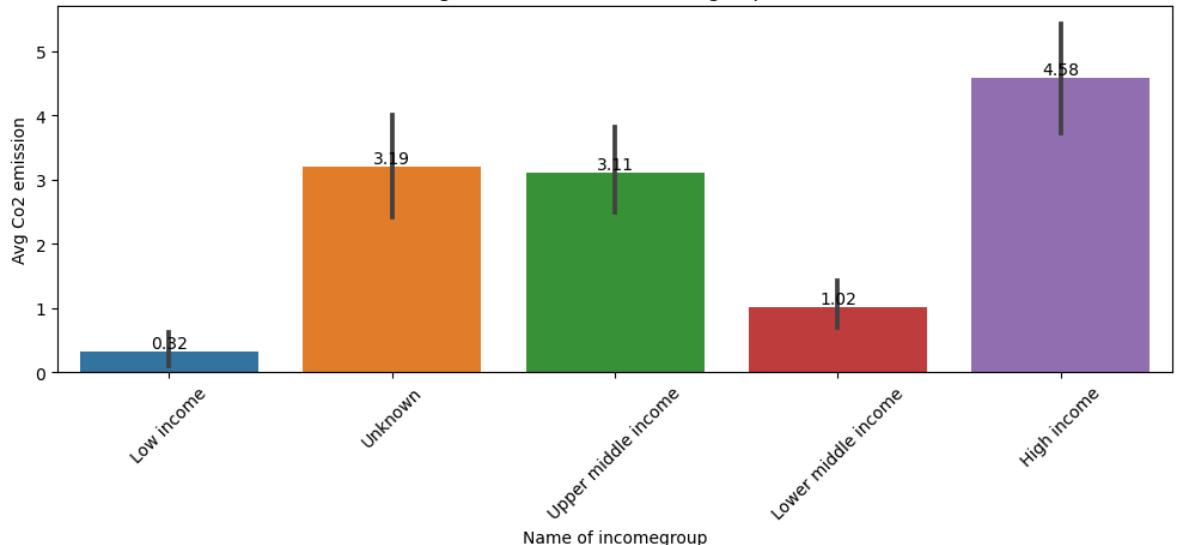
Average Co2 emission of incomegroup in 1997



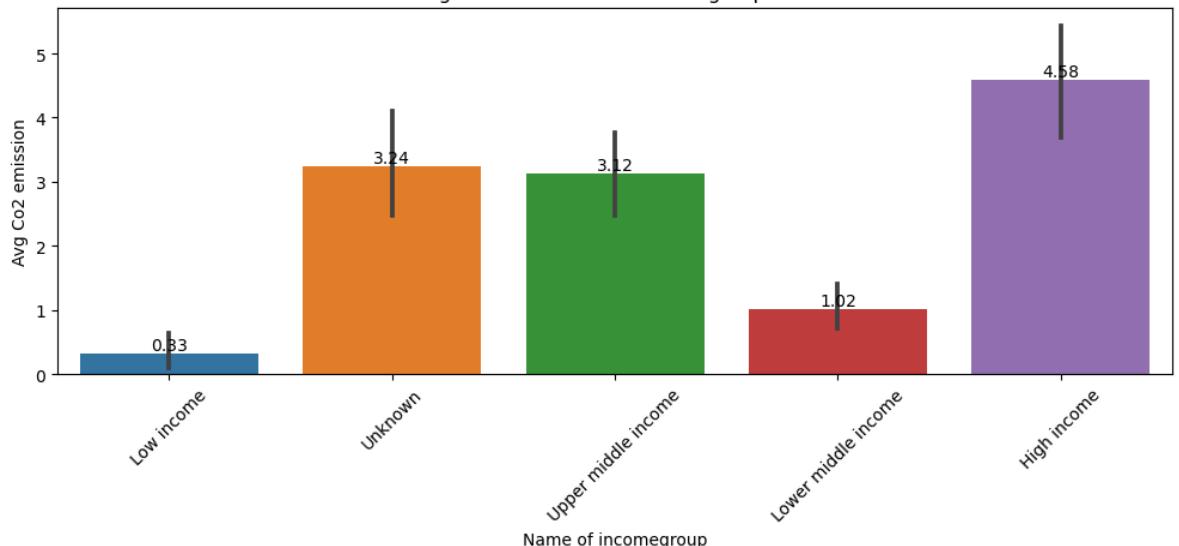
Average Co2 emission of incomegroup in 1998



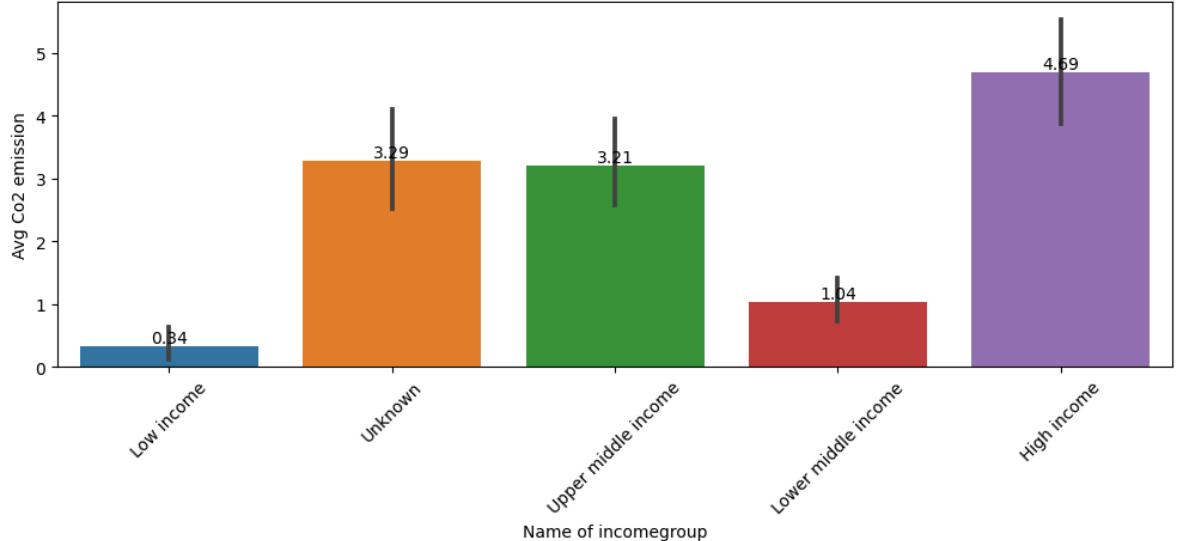
Average Co2 emission of incomegroup in 1999



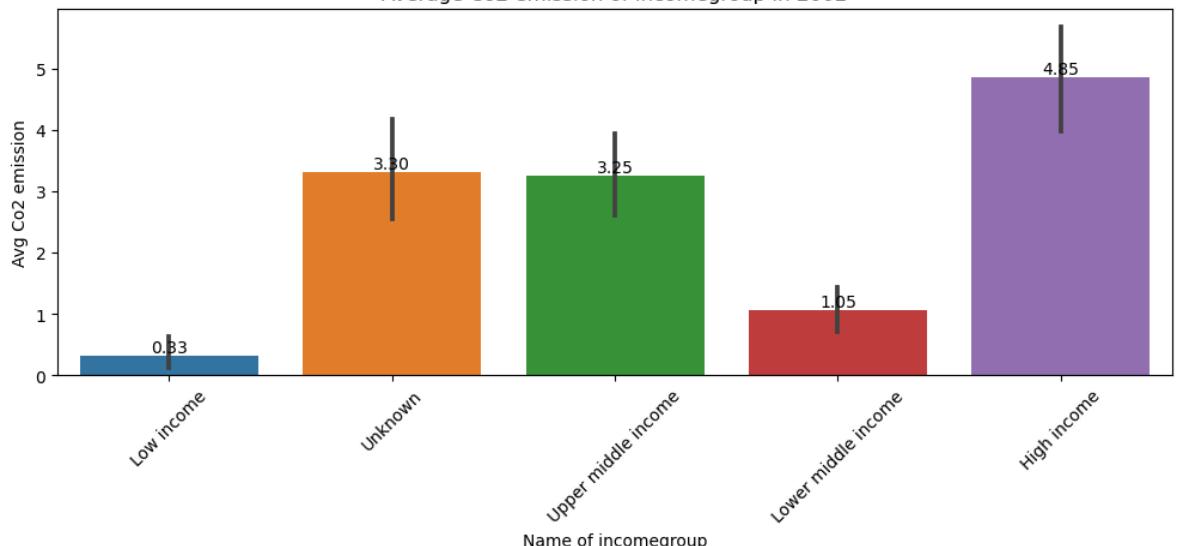
Average Co2 emission of incomegroup in 2000



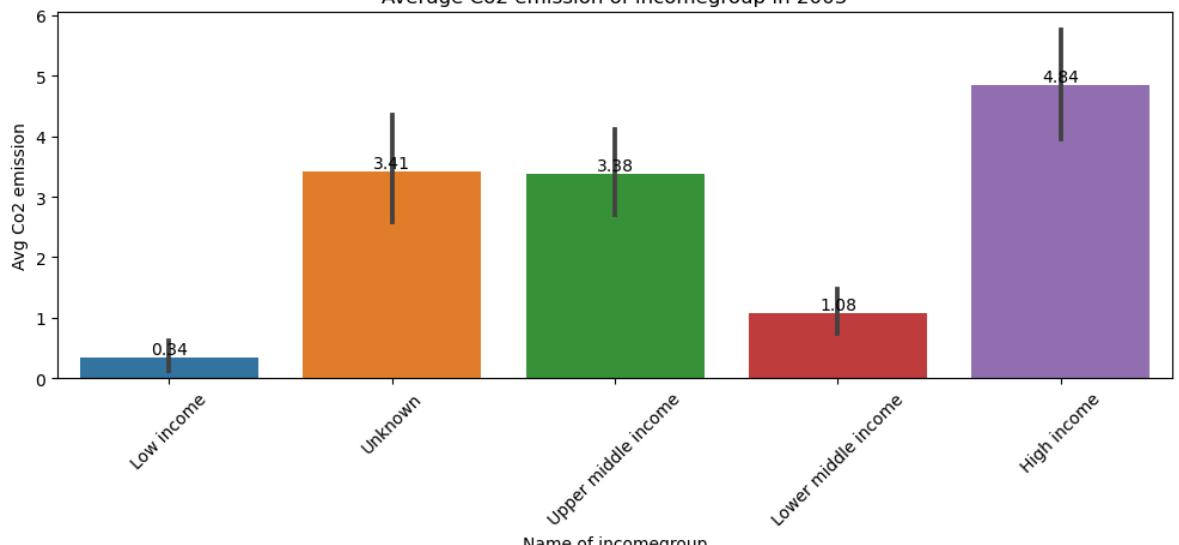
Average Co2 emission of incomegroup in 2001



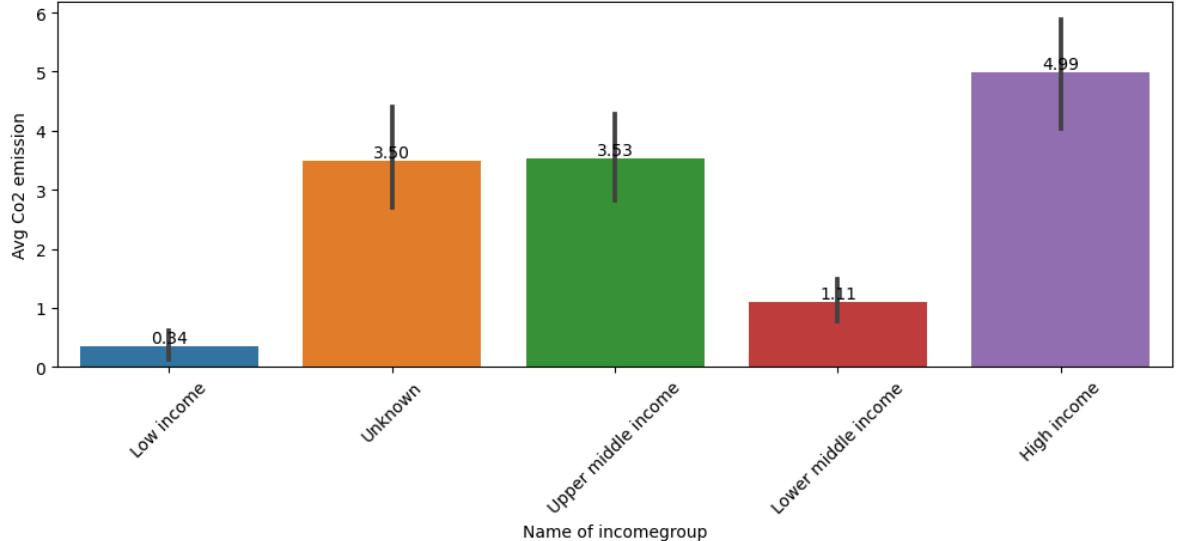
Average Co2 emission of incomegroup in 2002



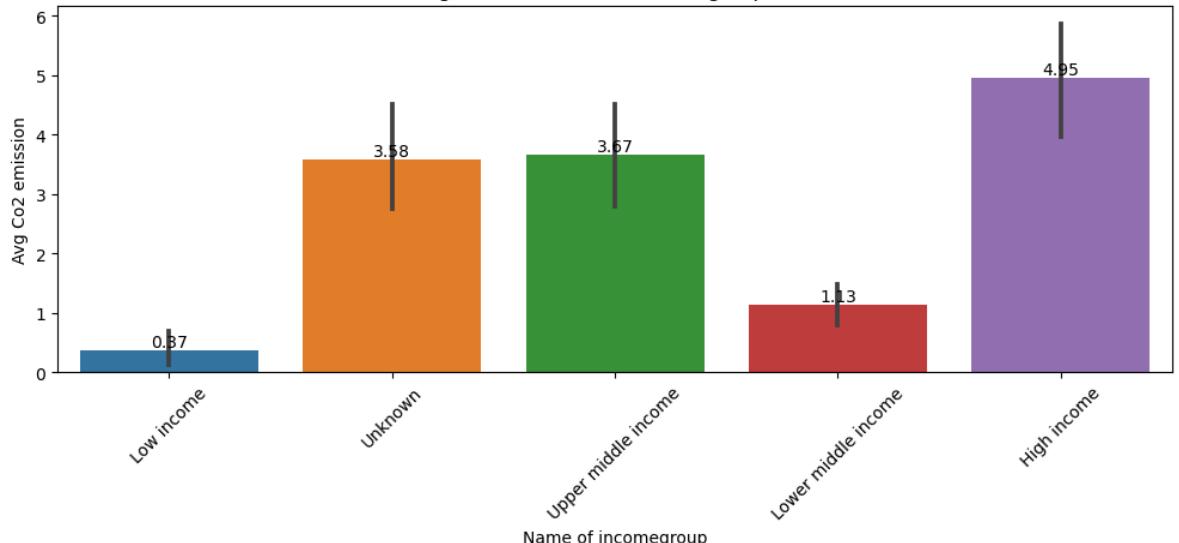
Average Co2 emission of incomegroup in 2003



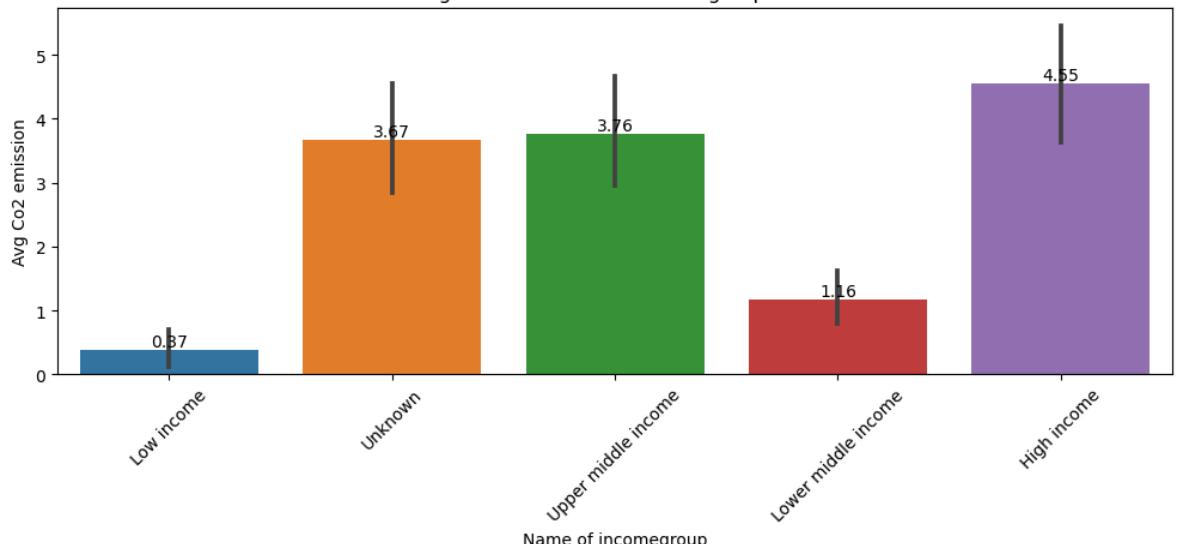
Average Co2 emission of incomegroup in 2004



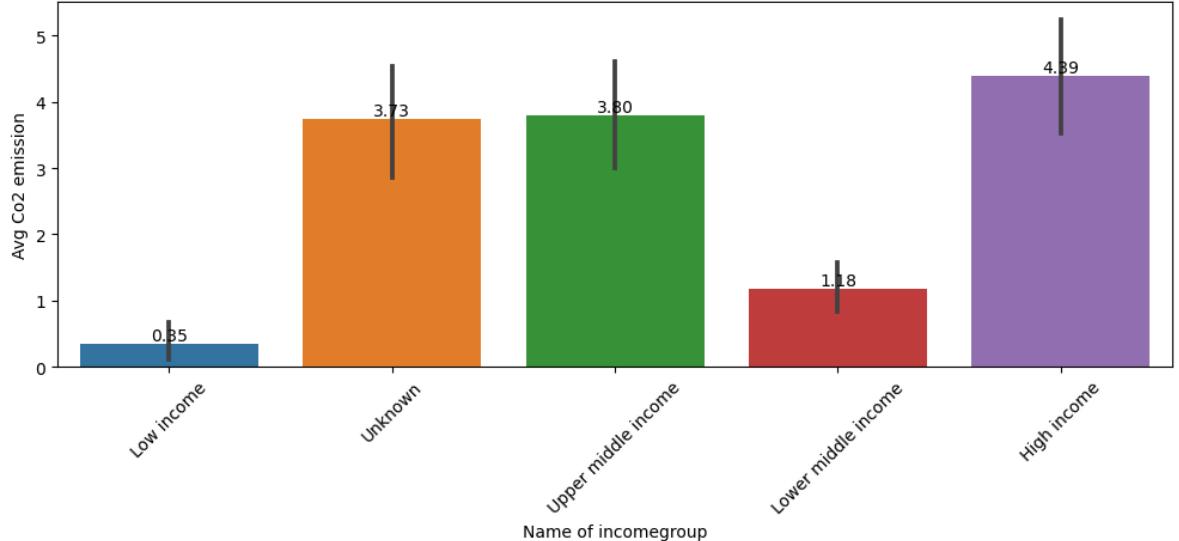
Average Co2 emission of incomegroup in 2005



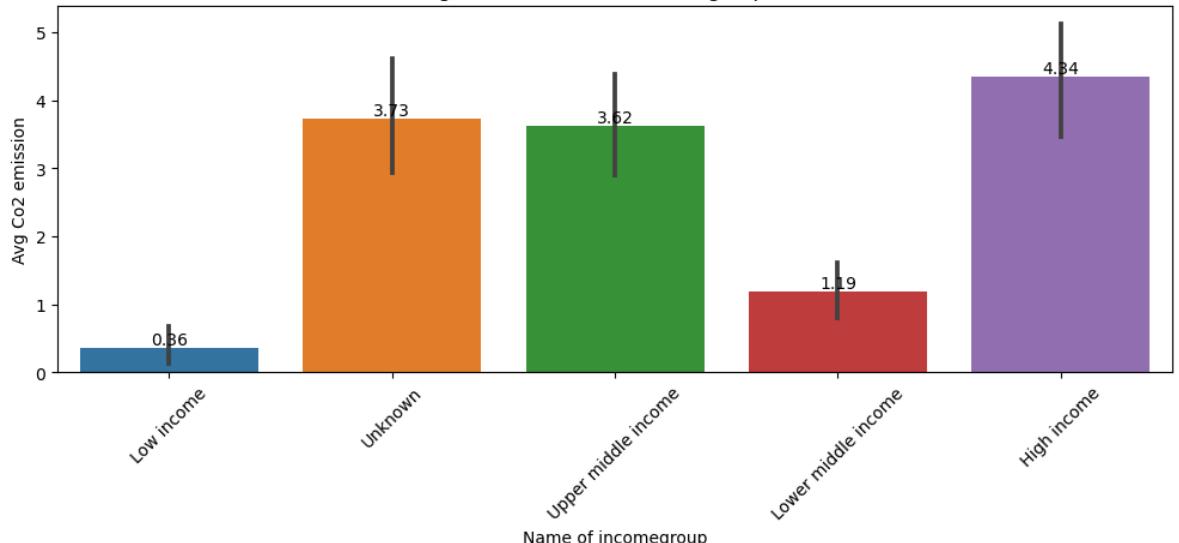
Average Co2 emission of incomegroup in 2006



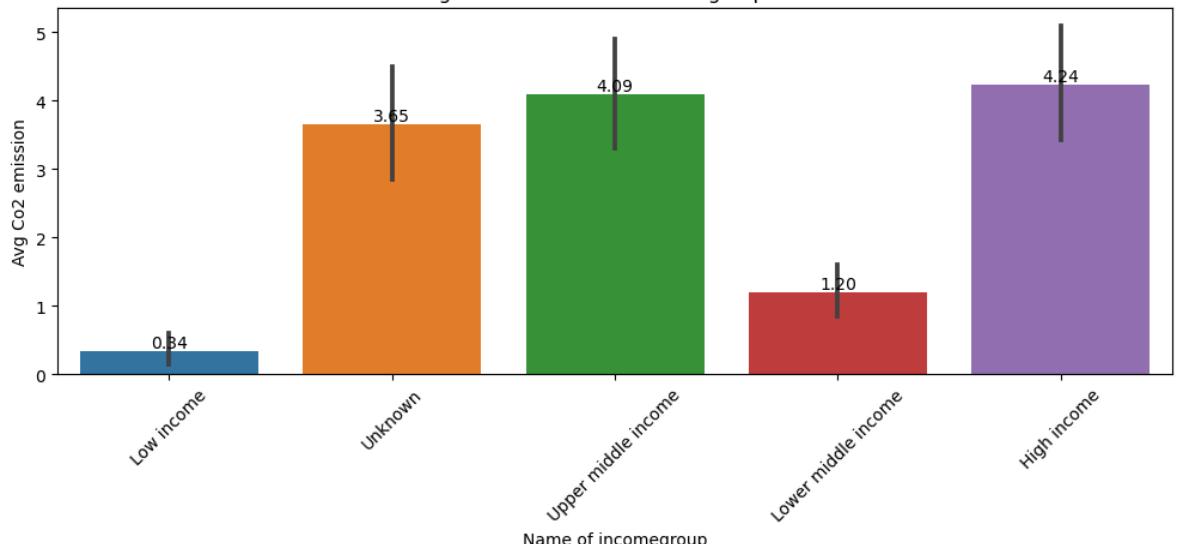
Average Co2 emission of incomegroup in 2007



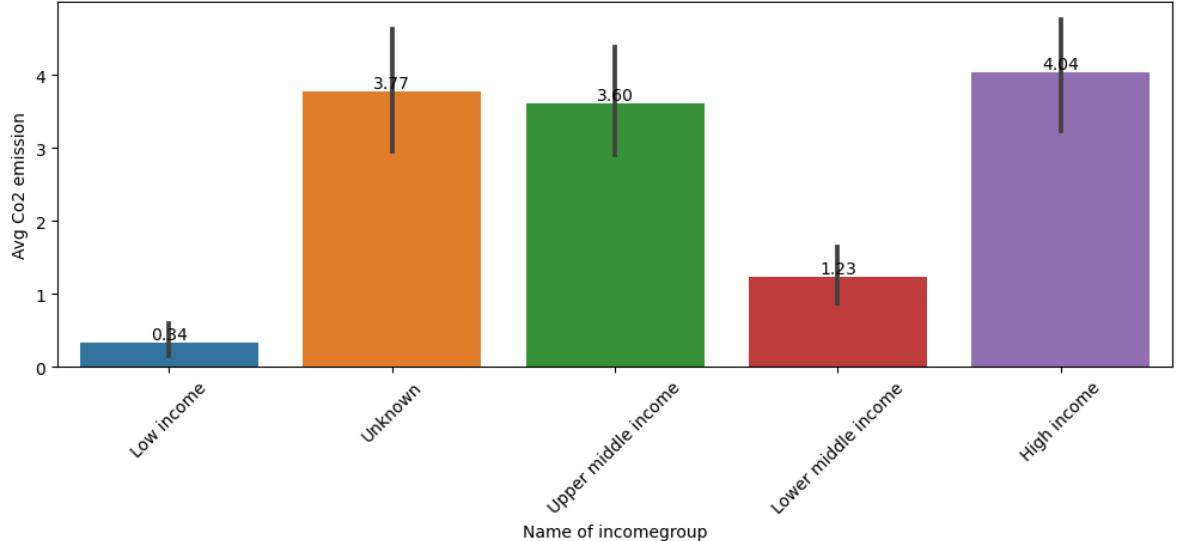
Average Co2 emission of incomegroup in 2008



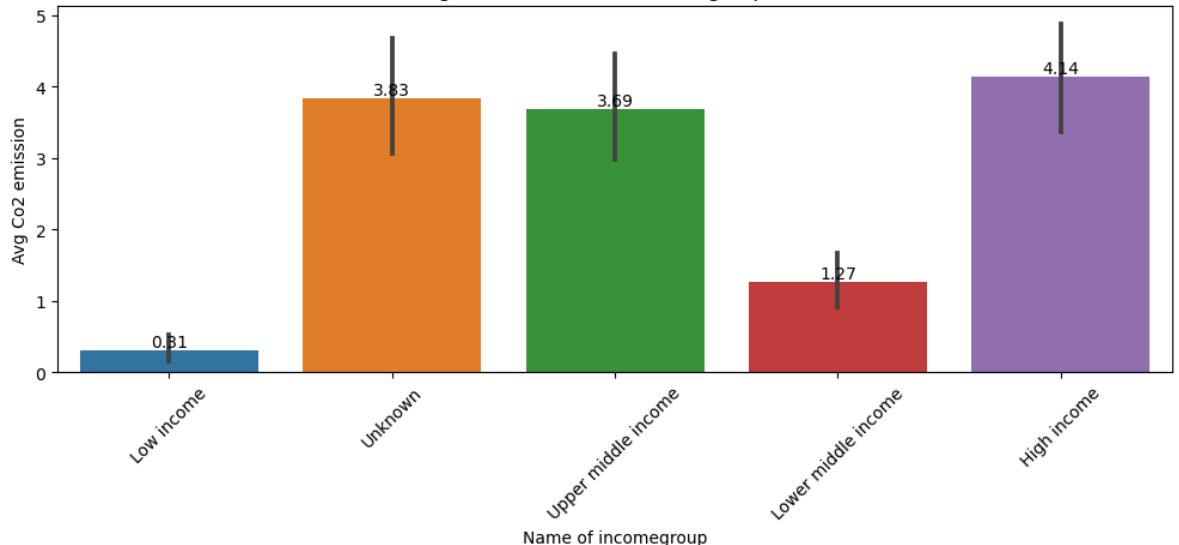
Average Co2 emission of incomegroup in 2009



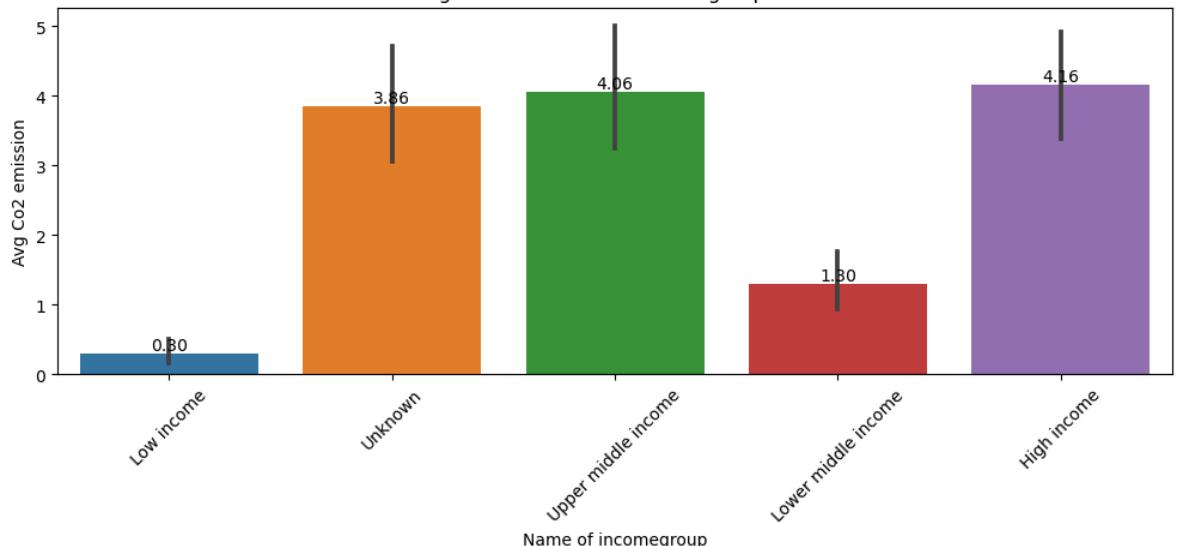
Average Co2 emission of incomegroup in 2010



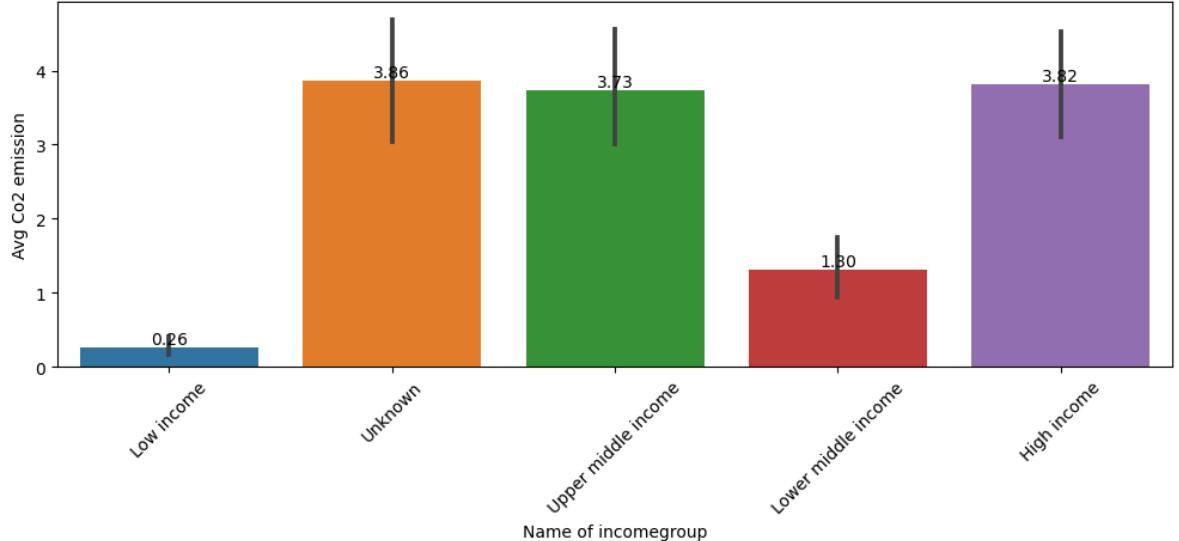
Average Co2 emission of incomegroup in 2011



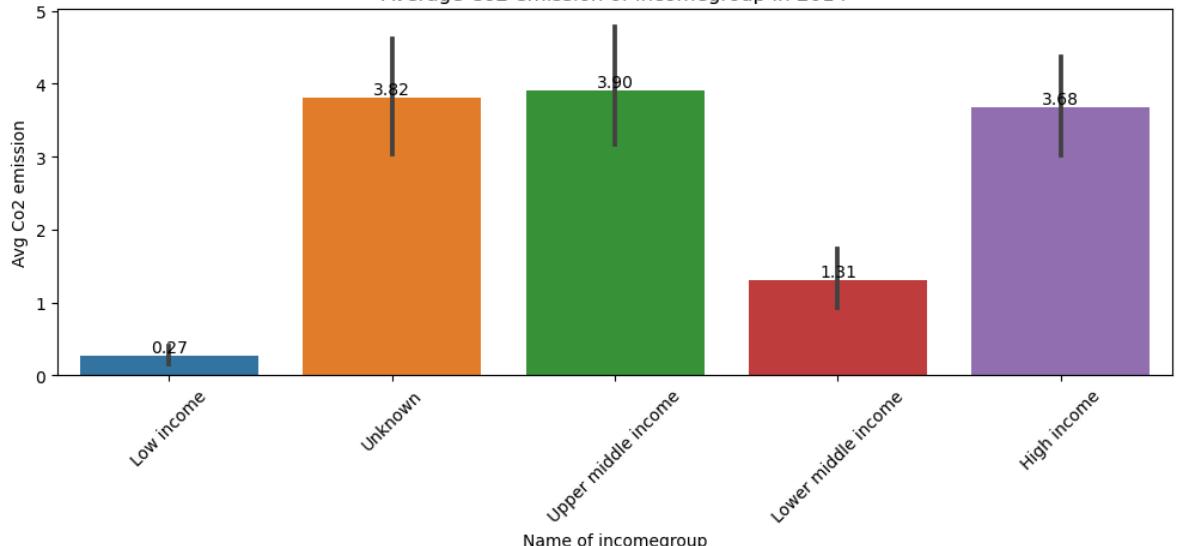
Average Co2 emission of incomegroup in 2012



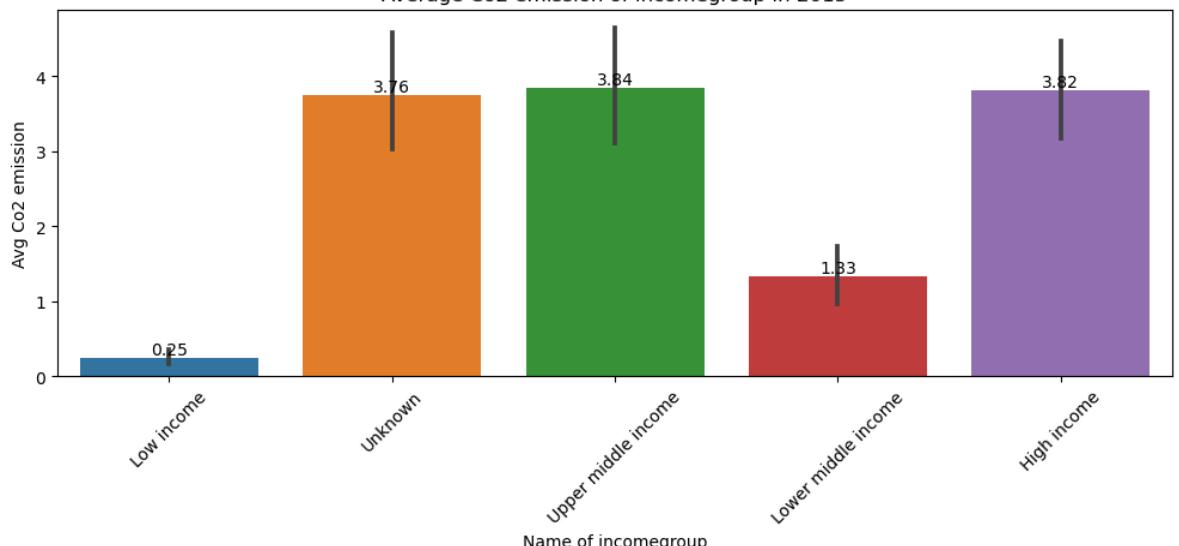
Average Co2 emission of incomegroup in 2013



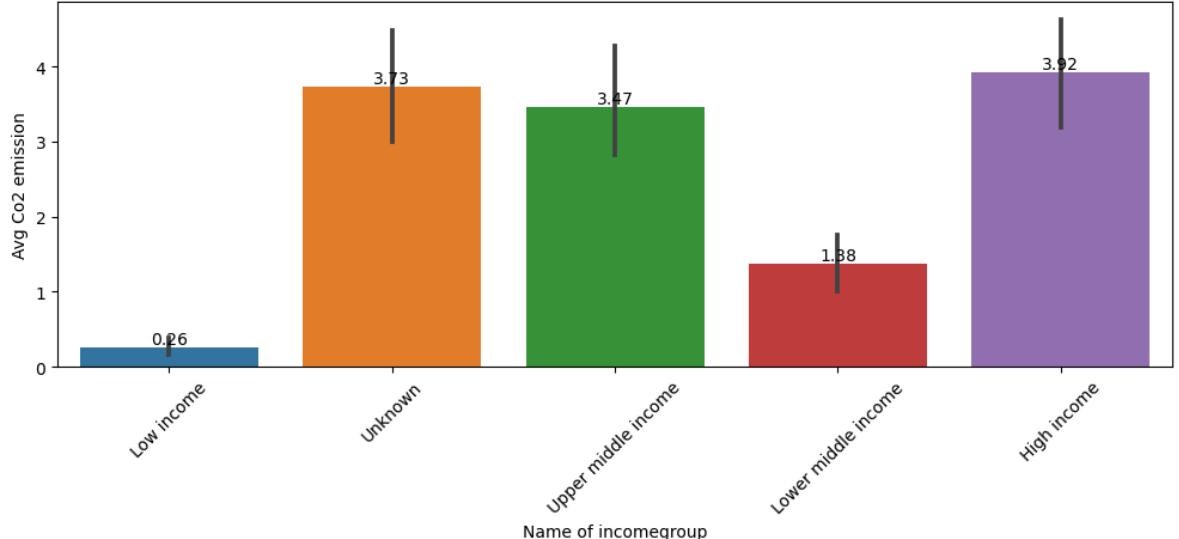
Average Co2 emission of incomegroup in 2014



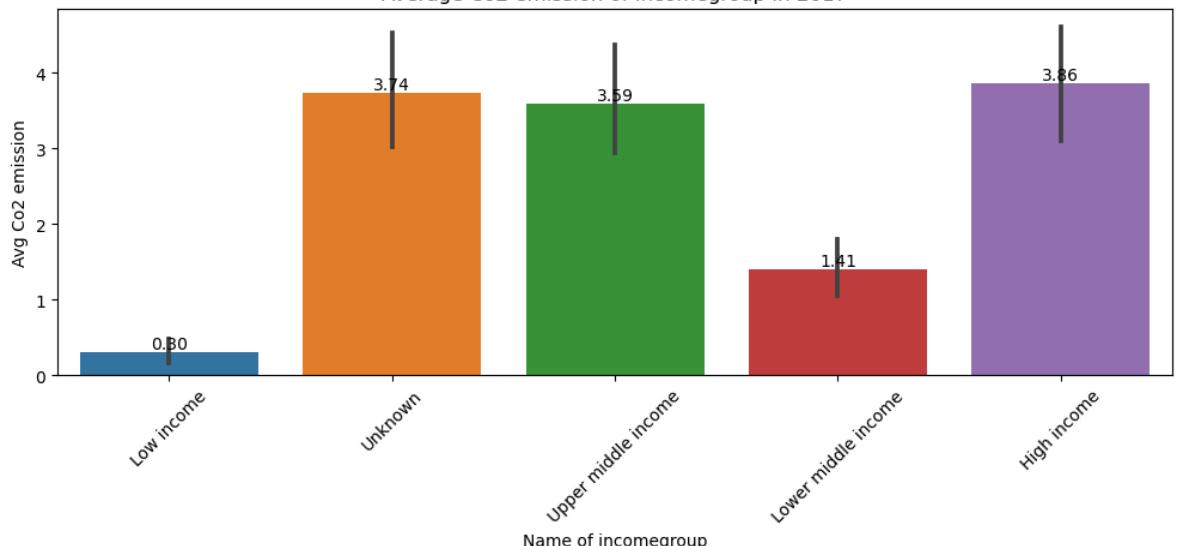
Average Co2 emission of incomegroup in 2015



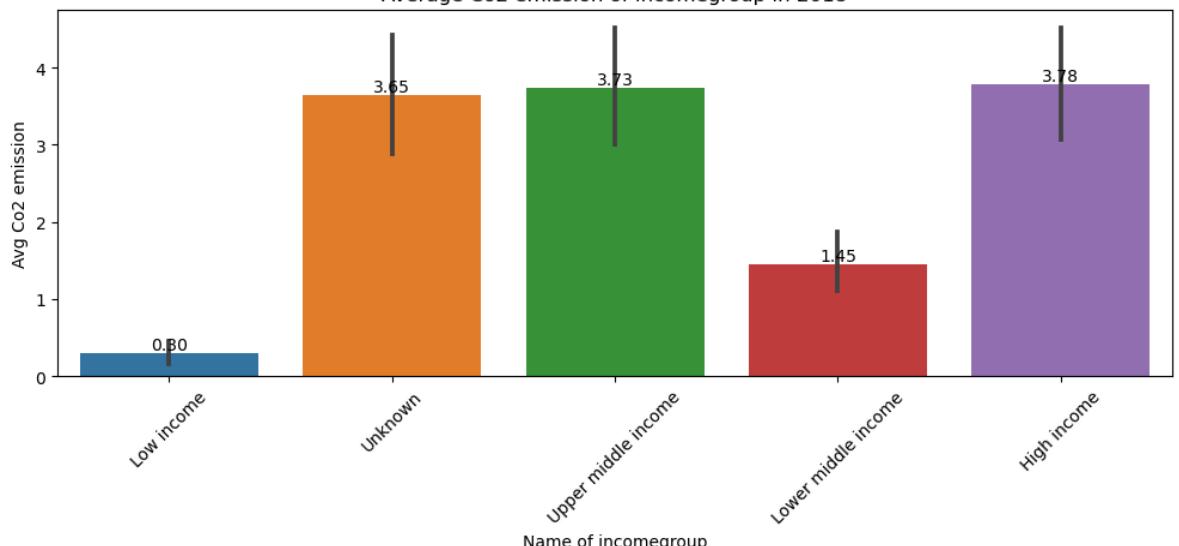
Average Co2 emission of incomegroup in 2016

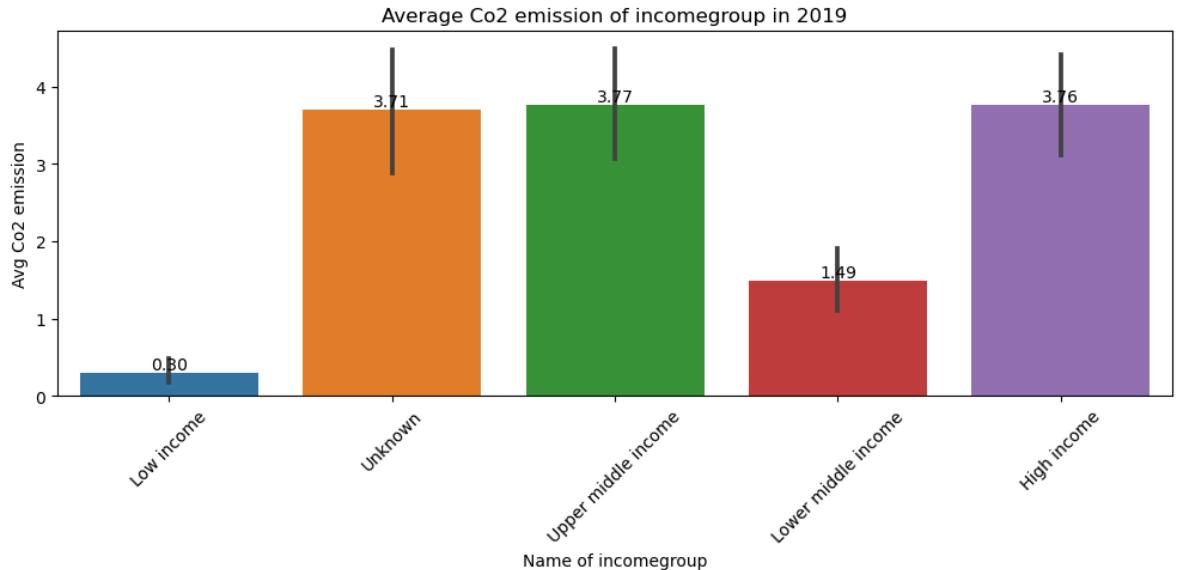


Average Co2 emission of incomegroup in 2017



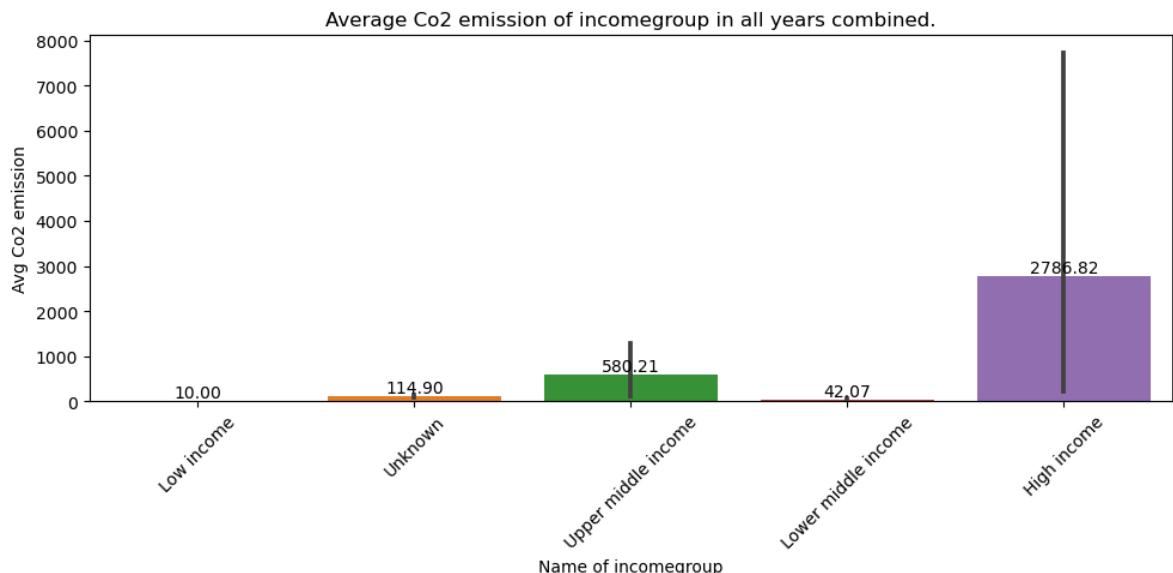
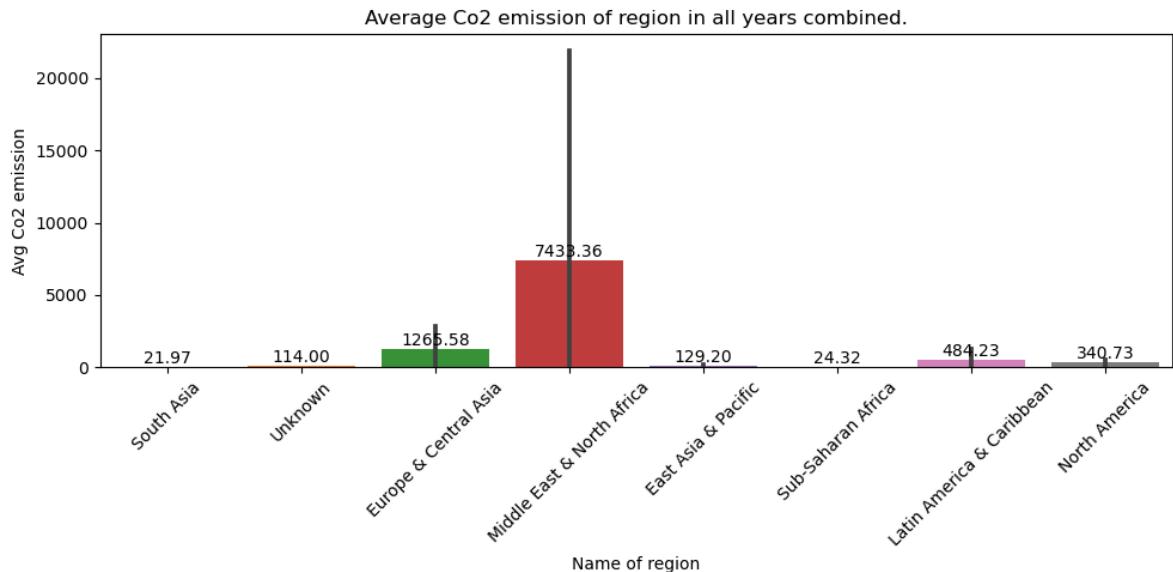
Average Co2 emission of incomegroup in 2018





In [55]: *# for all years combine*

```
In [56]: for i in cat:
    plt.figure(figsize = (10,5))
    ax = sns.barplot(x = i, y = df['total emission'], data = new_df)
    ax.bar_label(ax.containers[0], fmt = '%.2f')
    plt.title(f'Average Co2 emission of {i} in all years combined.')
    plt.xlabel(f'Name of {i}')
    plt.ylabel('Avg Co2 emission')
    plt.xticks(rotation = 45)
    plt.tight_layout()
    plt.show()
```



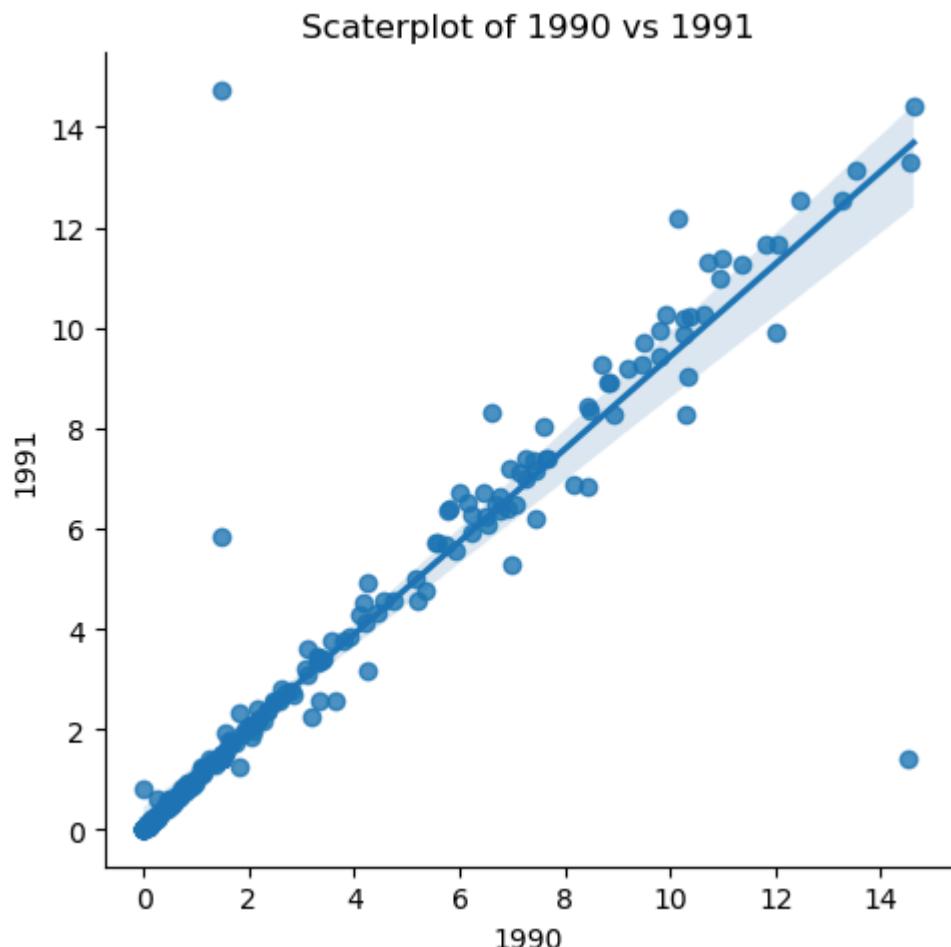
Num - Num Analysis

```
In [57]: # For each year
```

In [58]: num

Out[58]: ['1990',
 '1991',
 '1992',
 '1993',
 '1994',
 '1995',
 '1996',
 '1997',
 '1998',
 '1999',
 '2000',
 '2001',
 '2002',
 '2003',
 '2004',
 '2005',
 '2006',
 '2007',
 '2008',
 '2009',
 '2010',
 '2011',
 '2012',
 '2013',
 '2014',
 '2015',
 '2016',
 '2017',
 '2018',
 '2019']

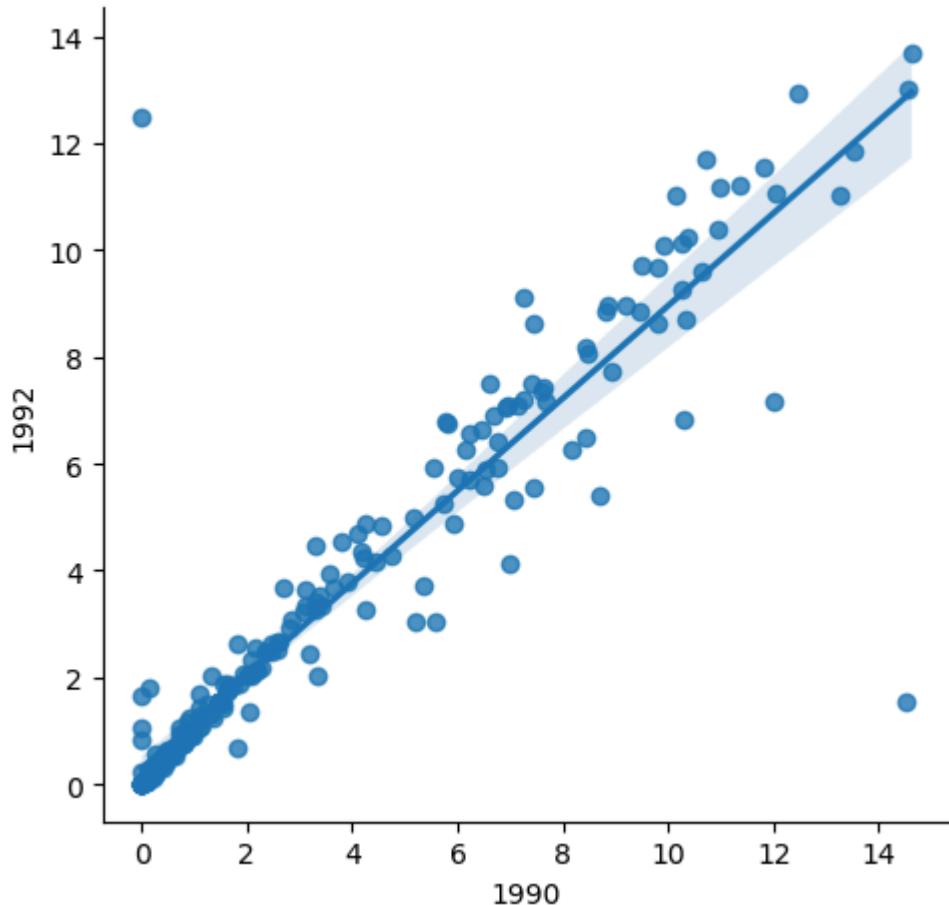
```
In [59]: for i in num:  
    for j in num:  
        if i != j and i < j:  
            sns.lmplot(x=i, y=j, data=df)  
            plt.title(f'Scaterplot of {i} vs {j}')  
            plt.tight_layout()  
            plt.show()  
            corr = df[i].corr(df[j])  
            print()  
            print(f'Corelation between {i} and {j} : {corr}')  
            print()  
            if corr > 0:  
                print(f'Corelation: Positively Corelated.')  
            elif corr < 0:  
                print(f'Corelation: Negatively Corelated.')  
            elif corr == 0:  
                print(f'Corelation: NO Corelation.')  
            print('-'*110)
```



Corelation between 1990 and 1991 : 0.9413725155774989

Corelation: Positively Corelated.

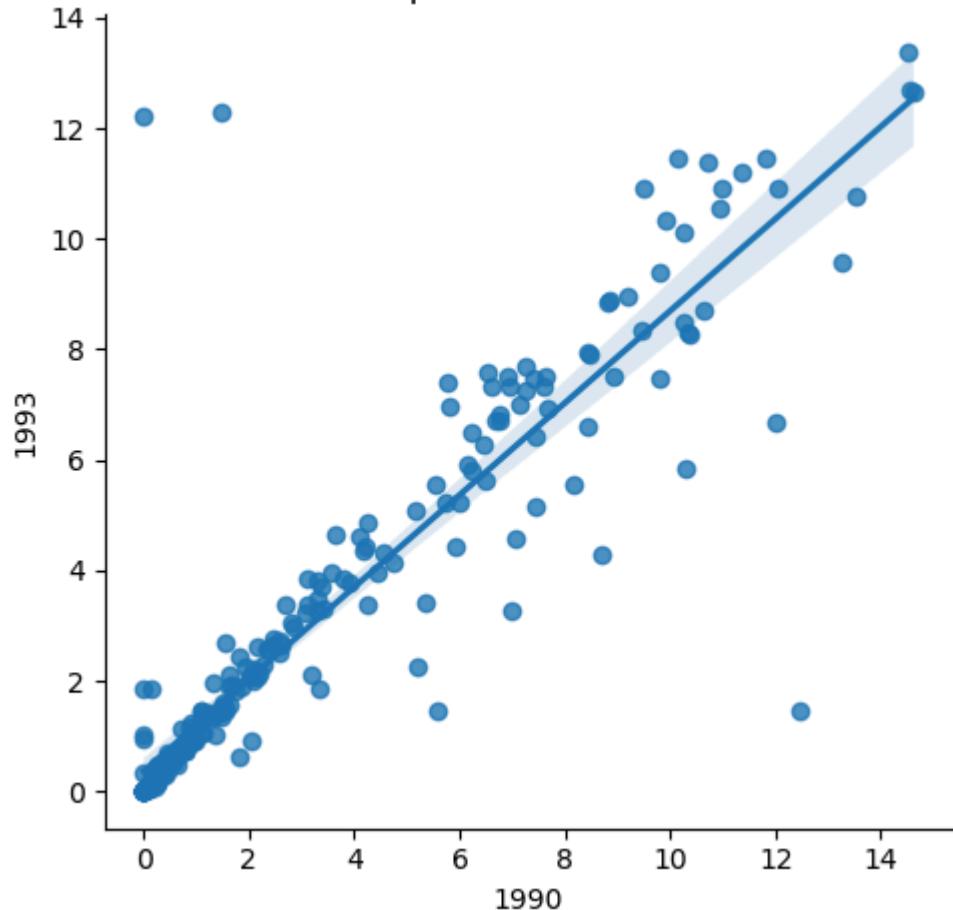
Scaterplot of 1990 vs 1992



Corelation between 1990 and 1992 : 0.932990674369093

Corelation: Positively Corelated.

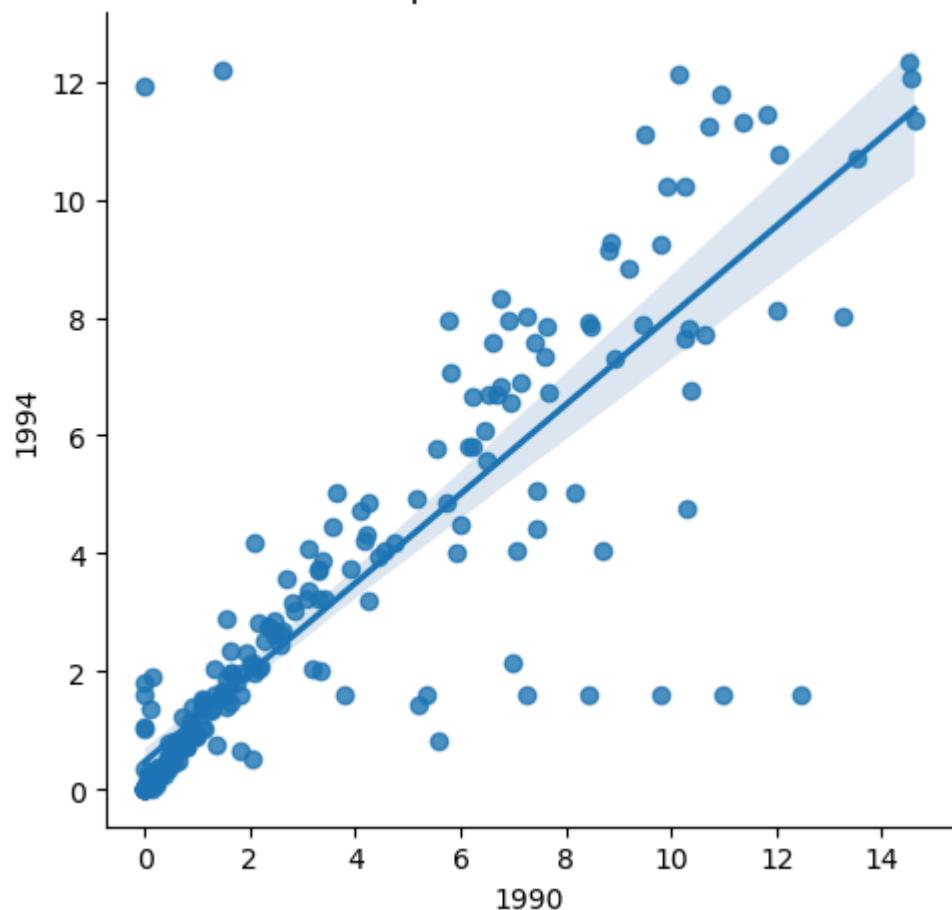
Scaterplot of 1990 vs 1993



Corelation between 1990 and 1993 : 0.9098467672839117

Corelation: Positively Corelated.

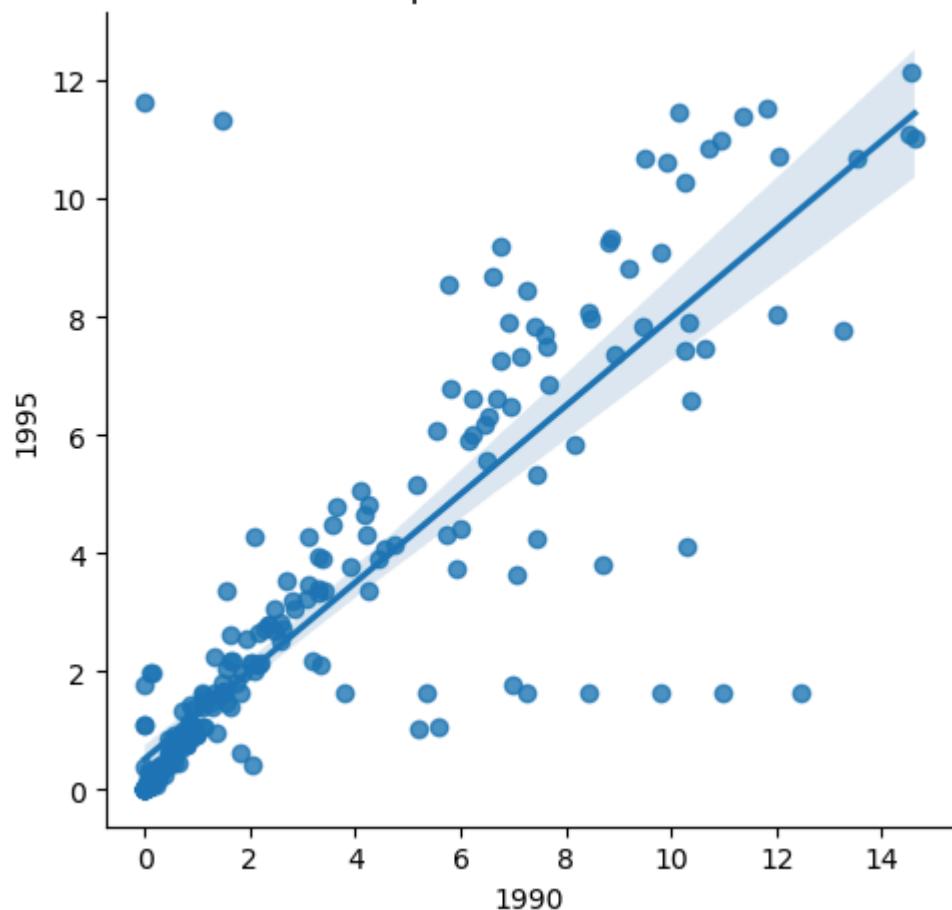
Scaterplot of 1990 vs 1994



Corelation between 1990 and 1994 : 0.857900717902197

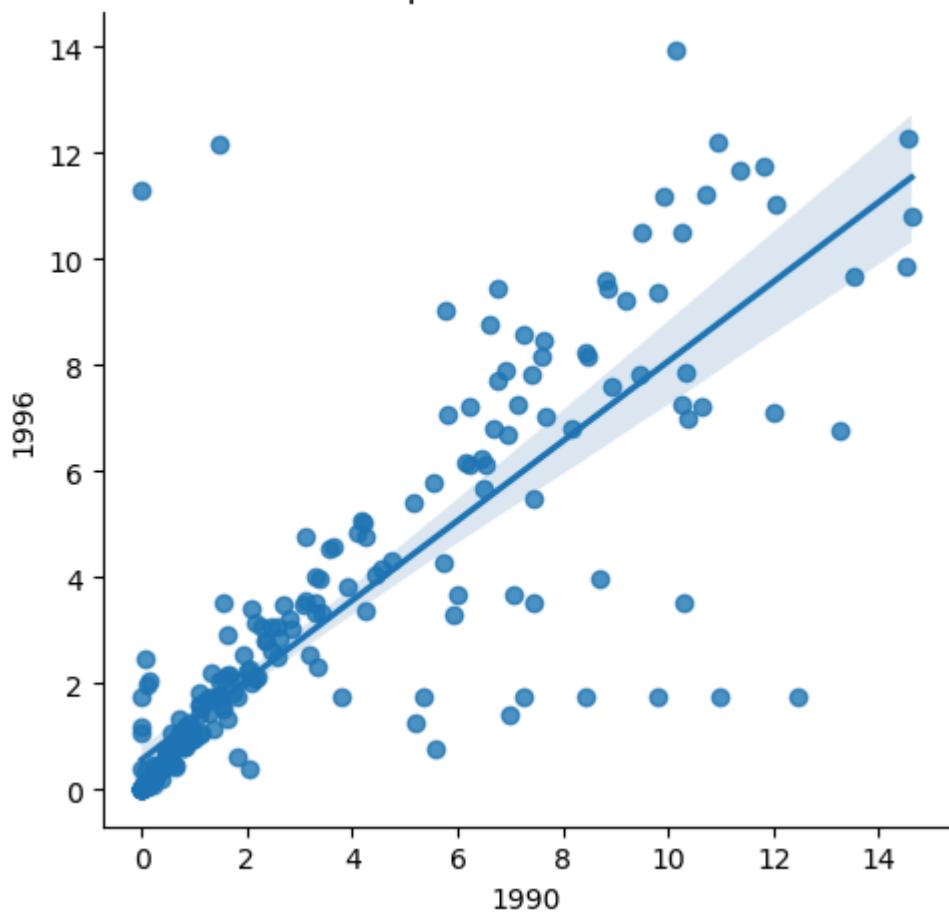
Corelation: Positively Corelated.

Scaterplot of 1990 vs 1995



Corelation between 1990 and 1995 : 0.8550521312189964

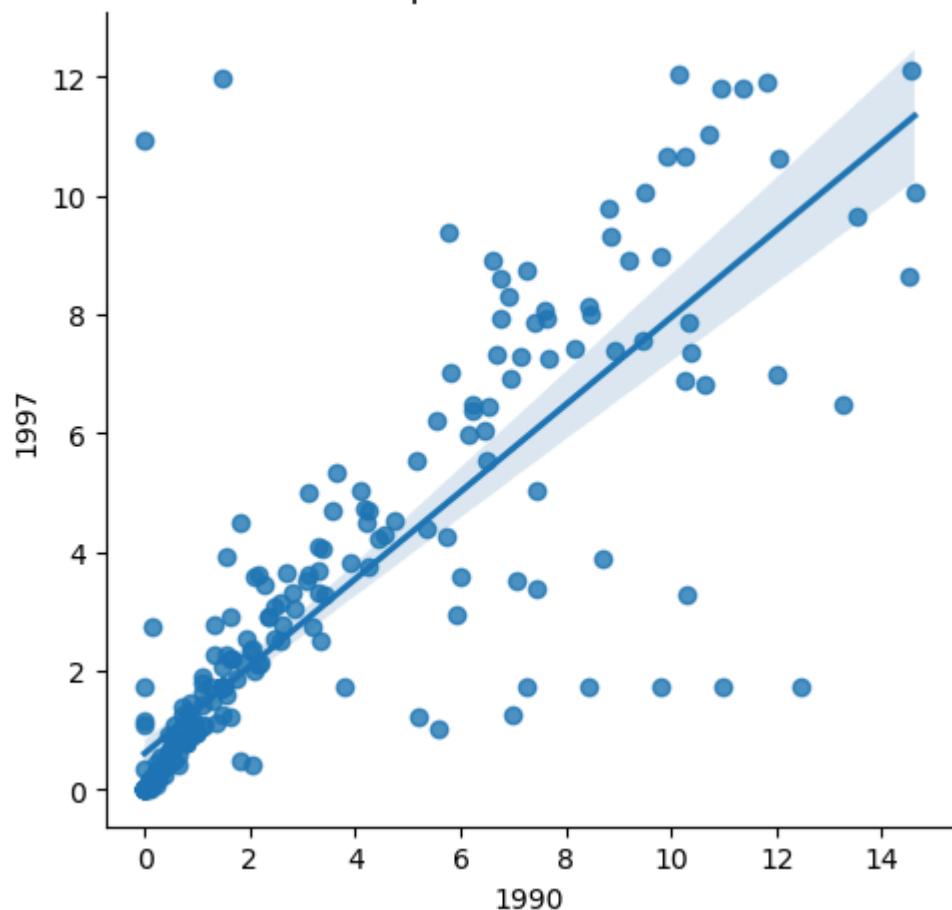
Corelation: Positively Corelated.

Scaterplot of 1990 vs 1996

Corelation between 1990 and 1996 : 0.8415987246924764

Corelation: Positively Corelated.

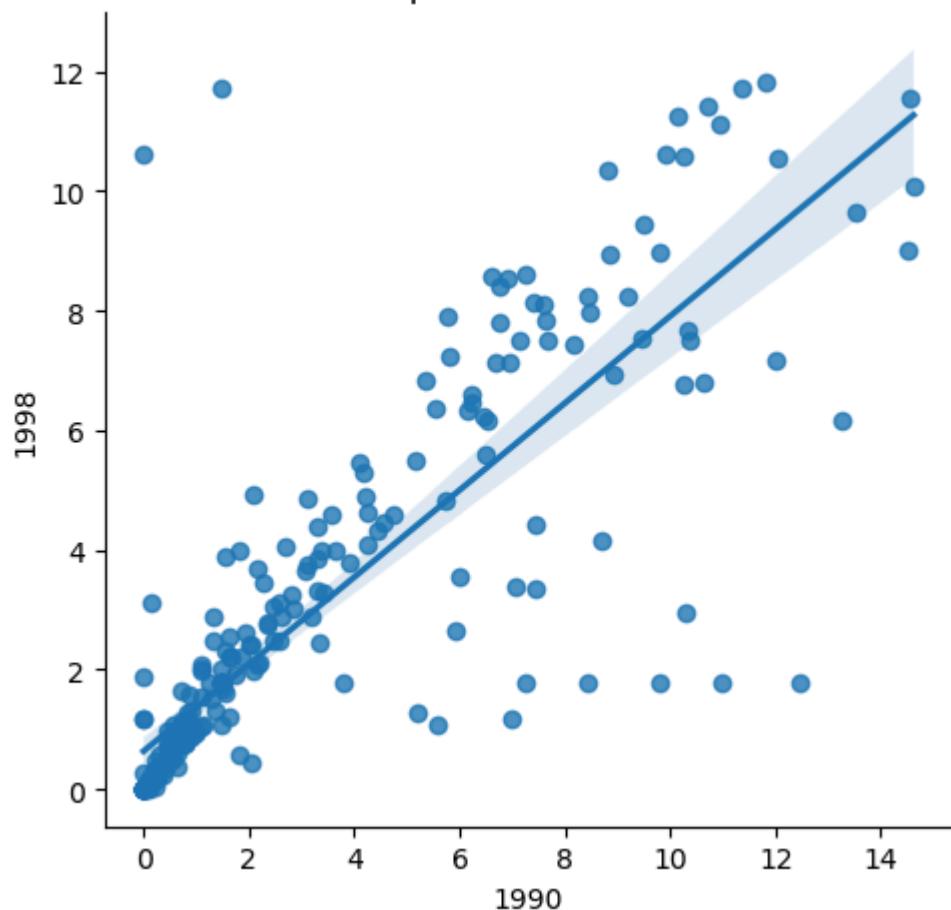
Scaterplot of 1990 vs 1997



Corelation between 1990 and 1997 : 0.8378838525153429

Corelation: Positively Corelated.

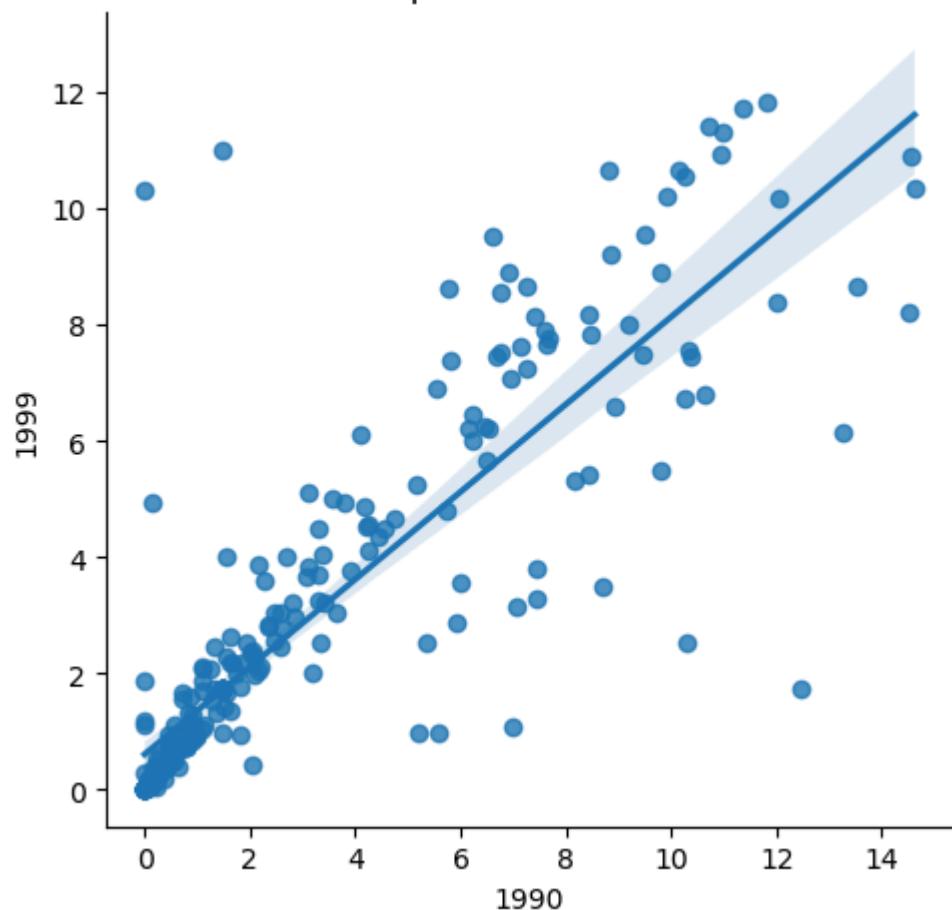
Scaterplot of 1990 vs 1998



Corelation between 1990 and 1998 : 0.8384073105005672

Corelation: Positively Corelated.

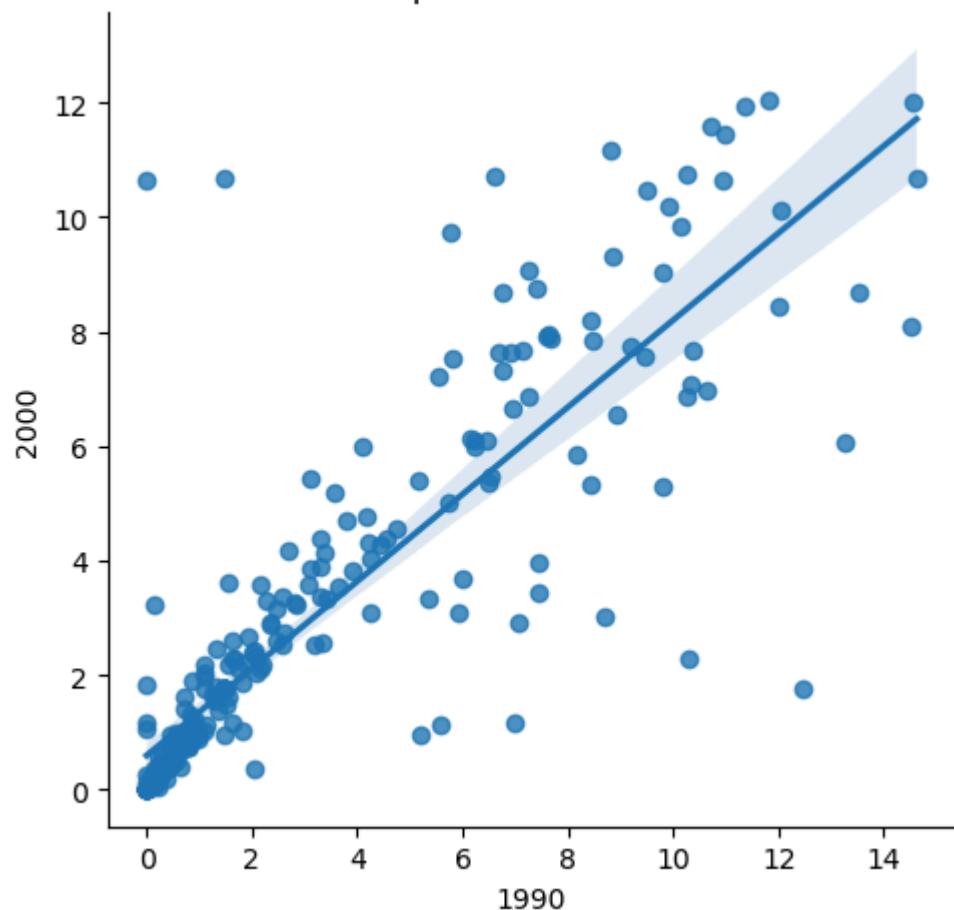
Scaterplot of 1990 vs 1999



Corelation between 1990 and 1999 : 0.862512333096508

Corelation: Positively Corelated.

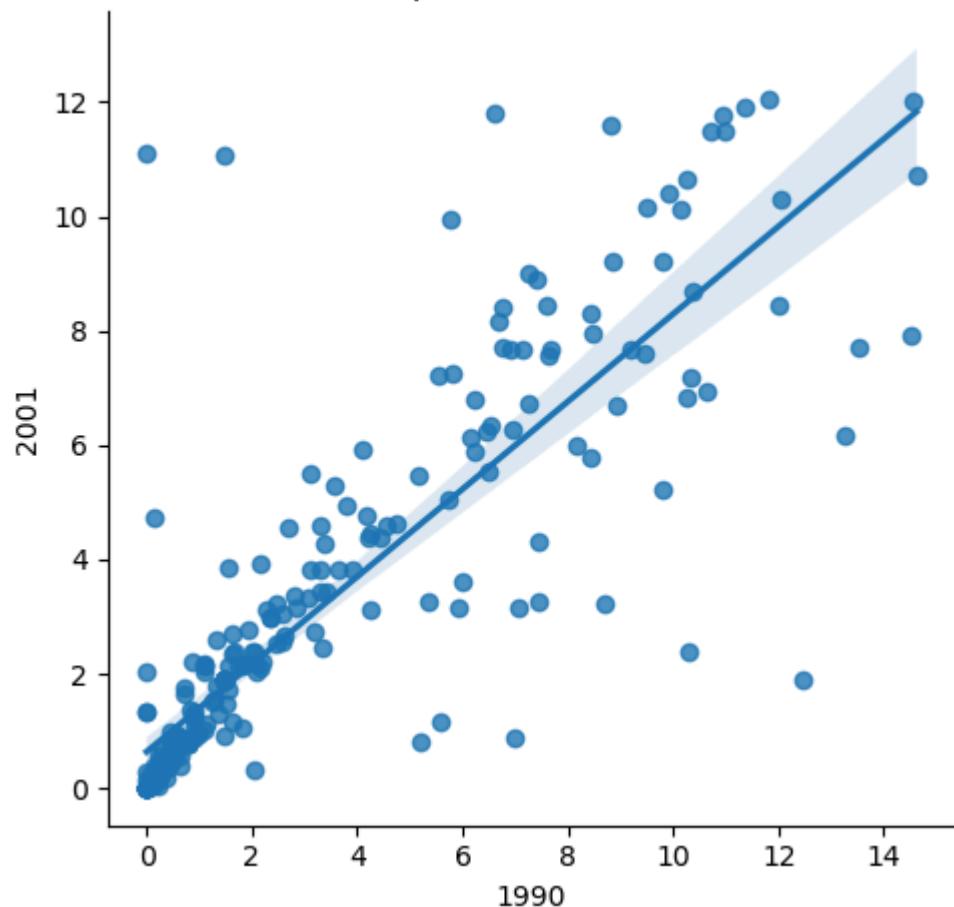
Scaterplot of 1990 vs 2000



Corelation between 1990 and 2000 : 0.8622336307139989

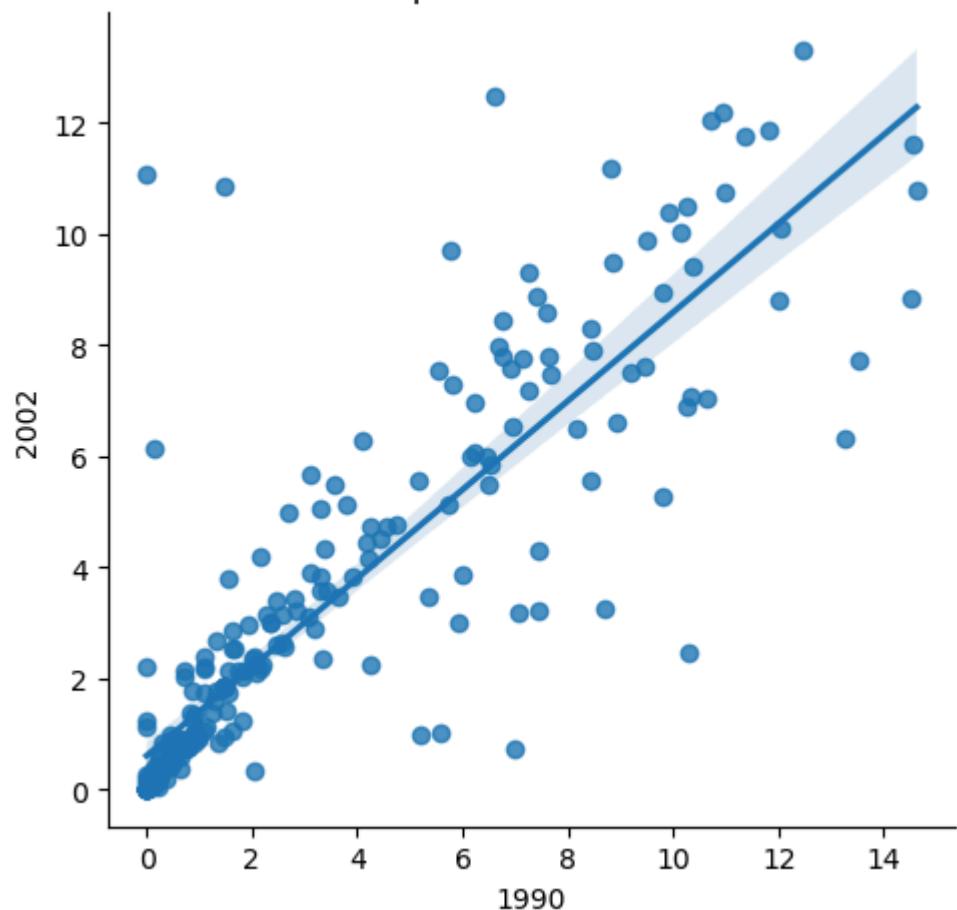
Corelation: Positively Corelated.

Scaterplot of 1990 vs 2001



Corelation between 1990 and 2001 : 0.8543369438741684

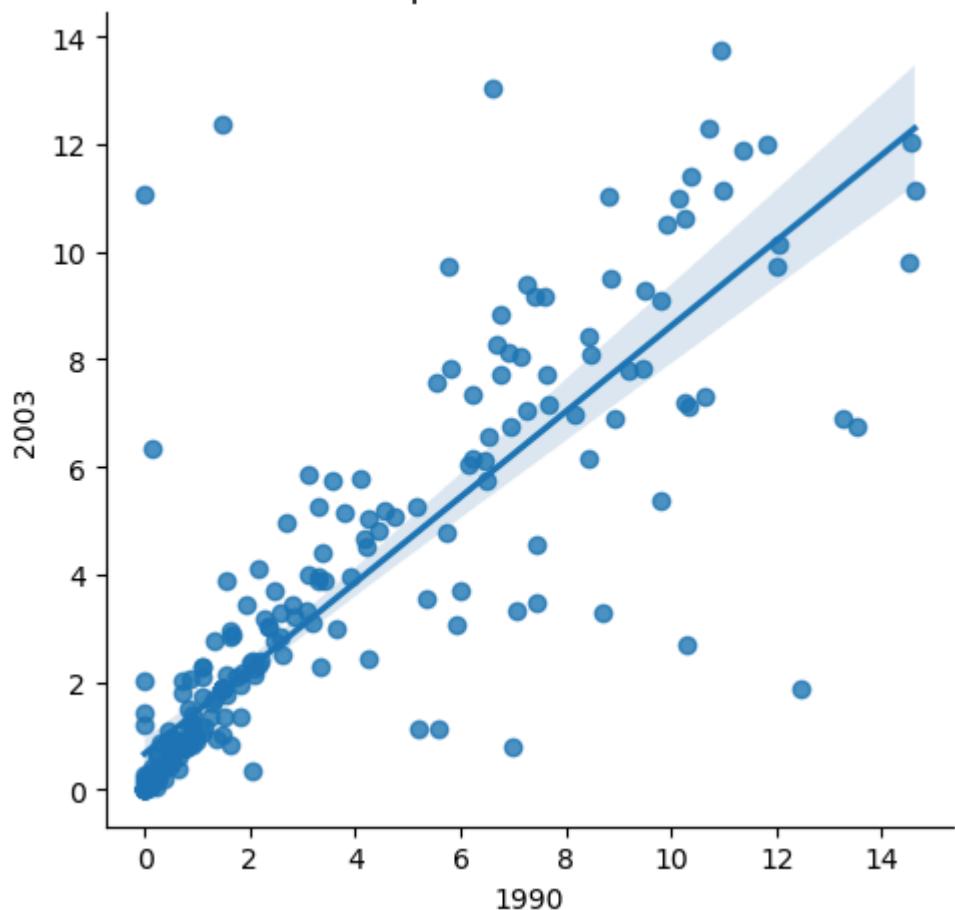
Corelation: Positively Corelated.

Scaterplot of 1990 vs 2002

Corelation between 1990 and 2002 : 0.8702941102601485

Corelation: Positively Corelated.

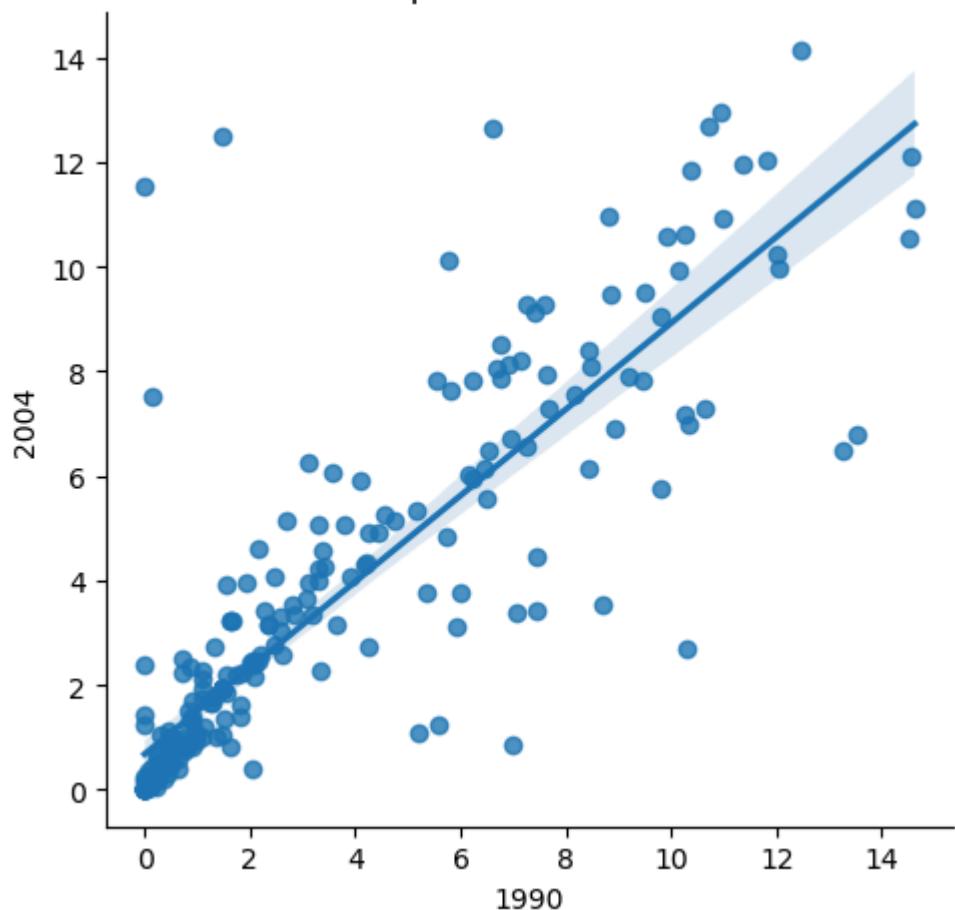
Scaterplot of 1990 vs 2003



Corelation between 1990 and 2003 : 0.851080440756446

Corelation: Positively Corelated.

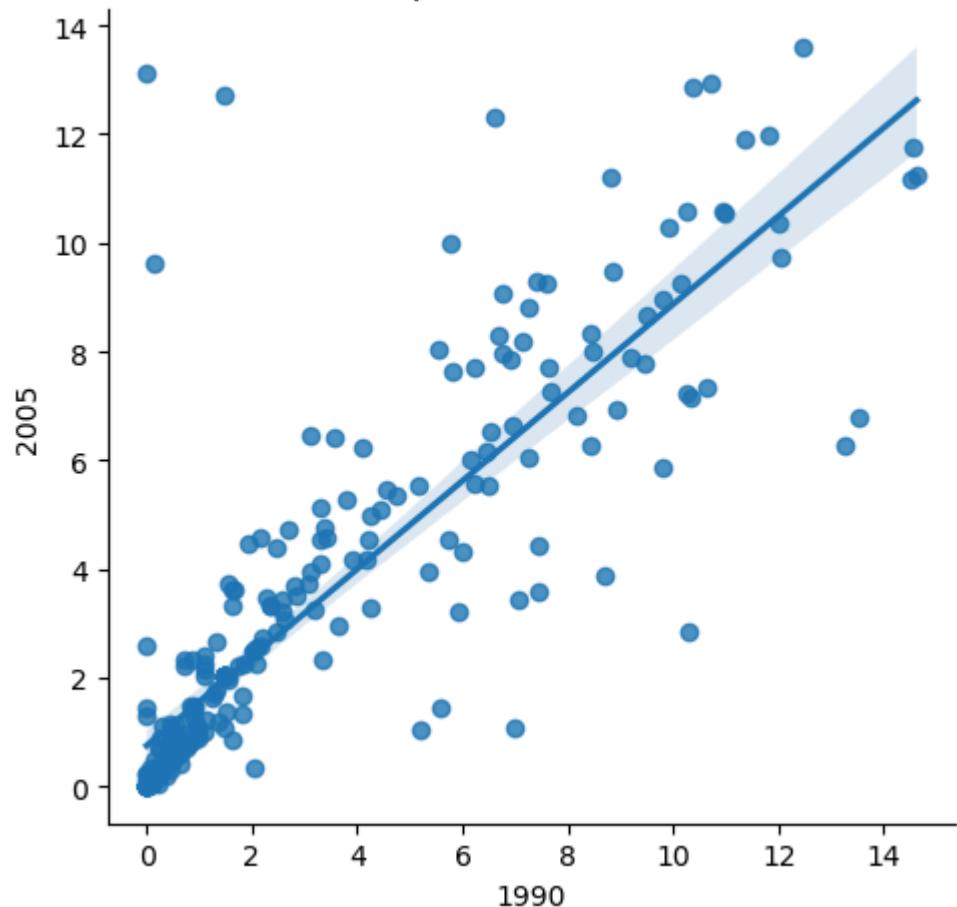
Scaterplot of 1990 vs 2004



Corelation between 1990 and 2004 : 0.8643200482456729

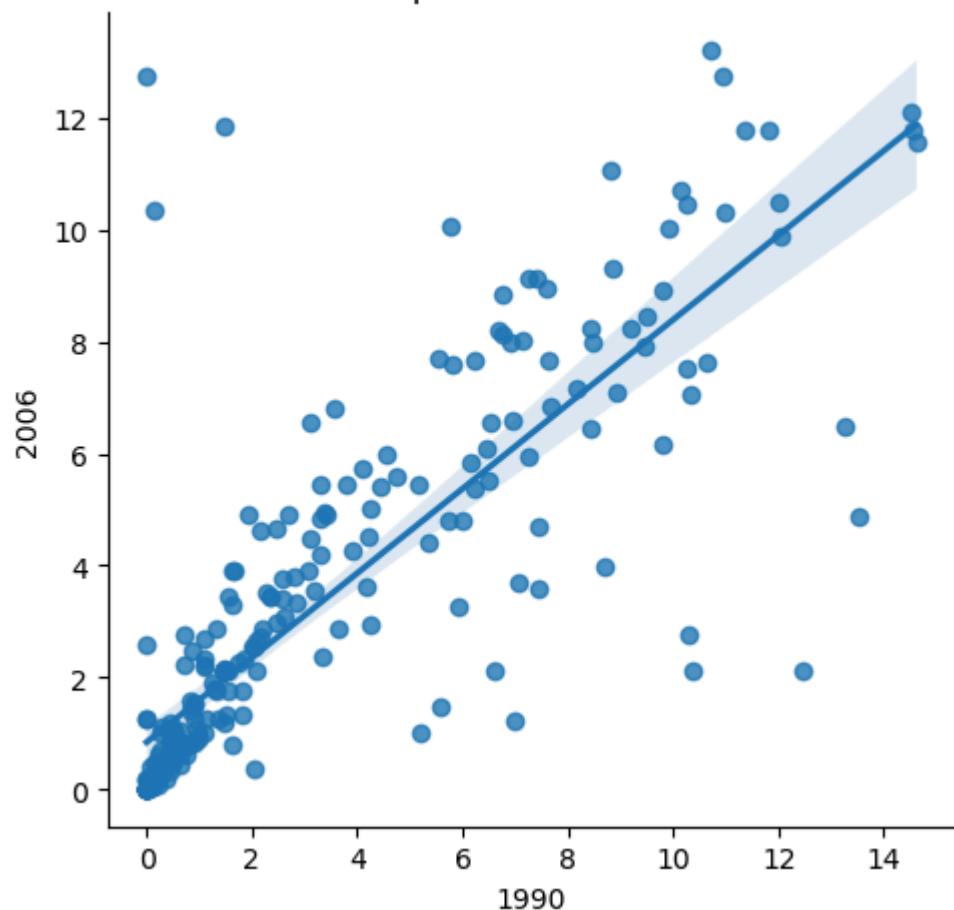
Corelation: Positively Corelated.

Scaterplot of 1990 vs 2005



Corelation between 1990 and 2005 : 0.8528593388171334

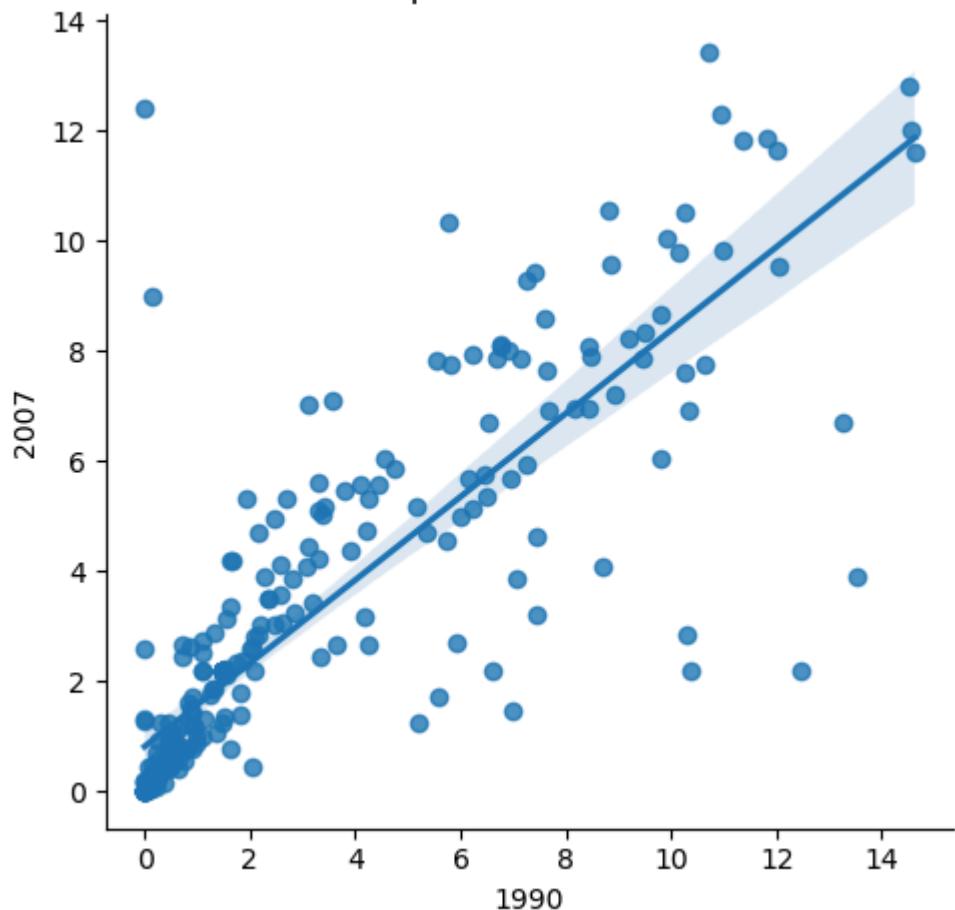
Corelation: Positively Corelated.

Scaterplot of 1990 vs 2006

Corelation between 1990 and 2006 : 0.8227898977888523

Corelation: Positively Corelated.

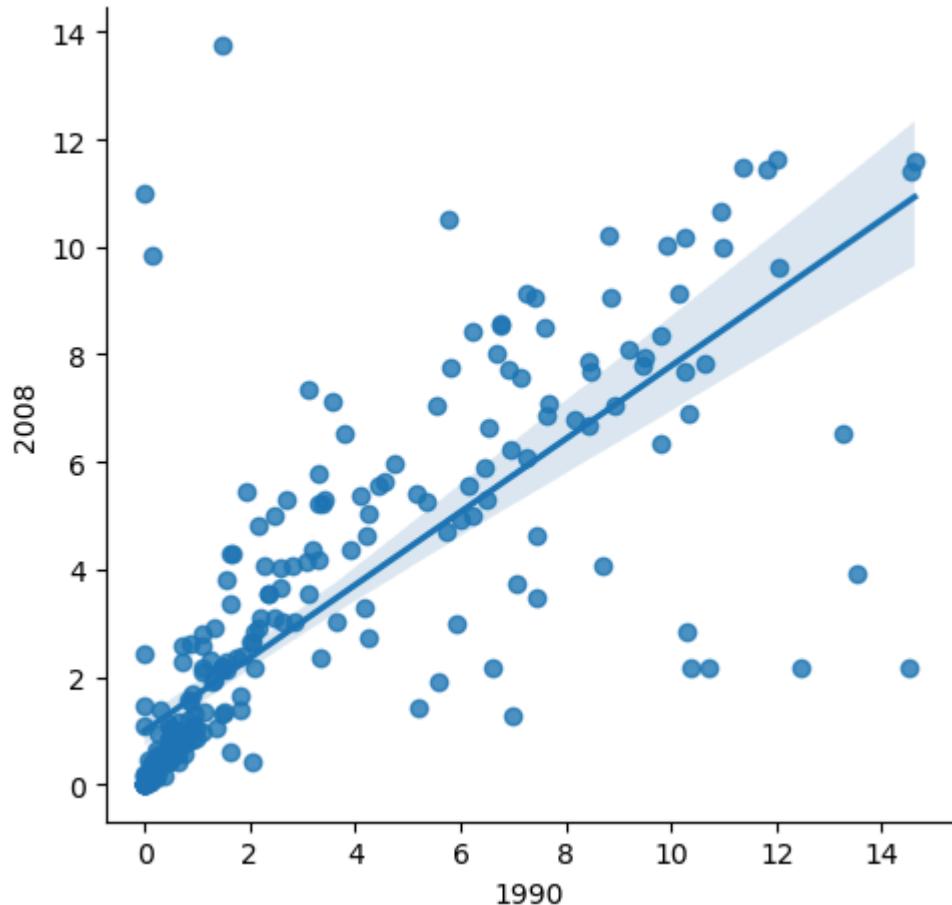
Scaterplot of 1990 vs 2007



Corelation between 1990 and 2007 : 0.8382179763414109

Corelation: Positively Corelated.

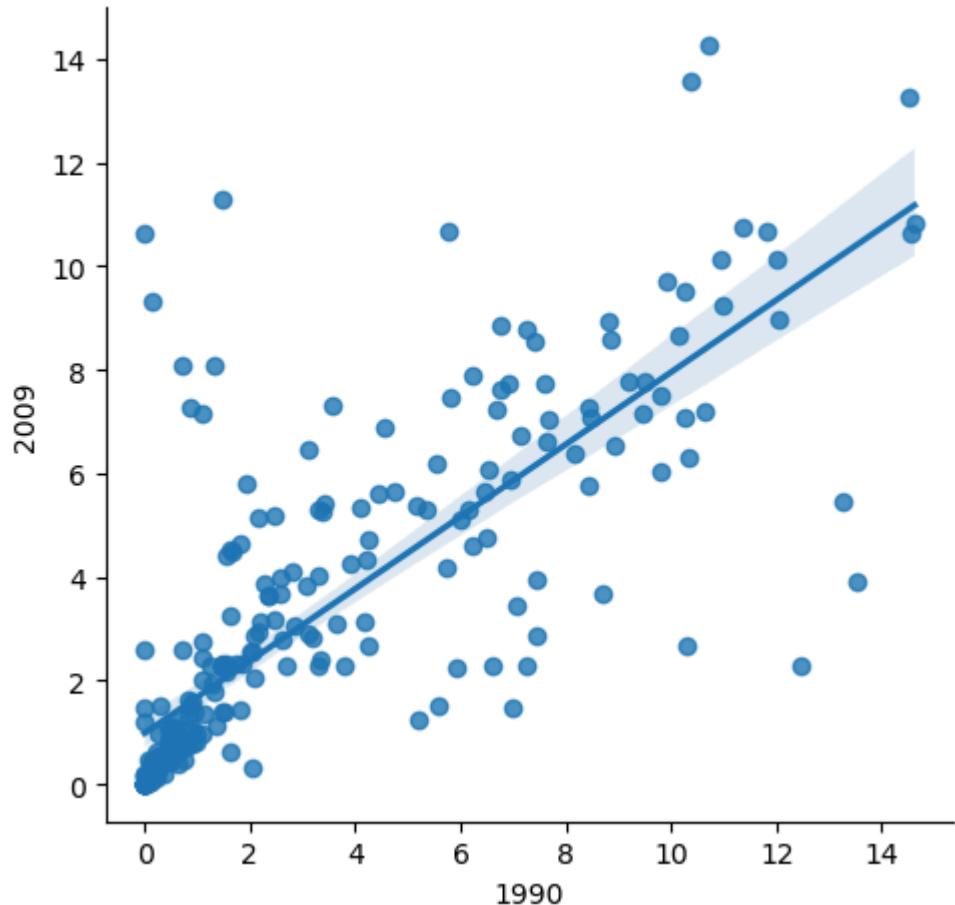
Scaterplot of 1990 vs 2008



Corelation between 1990 and 2008 : 0.7778296968354288

Corelation: Positively Corelated.

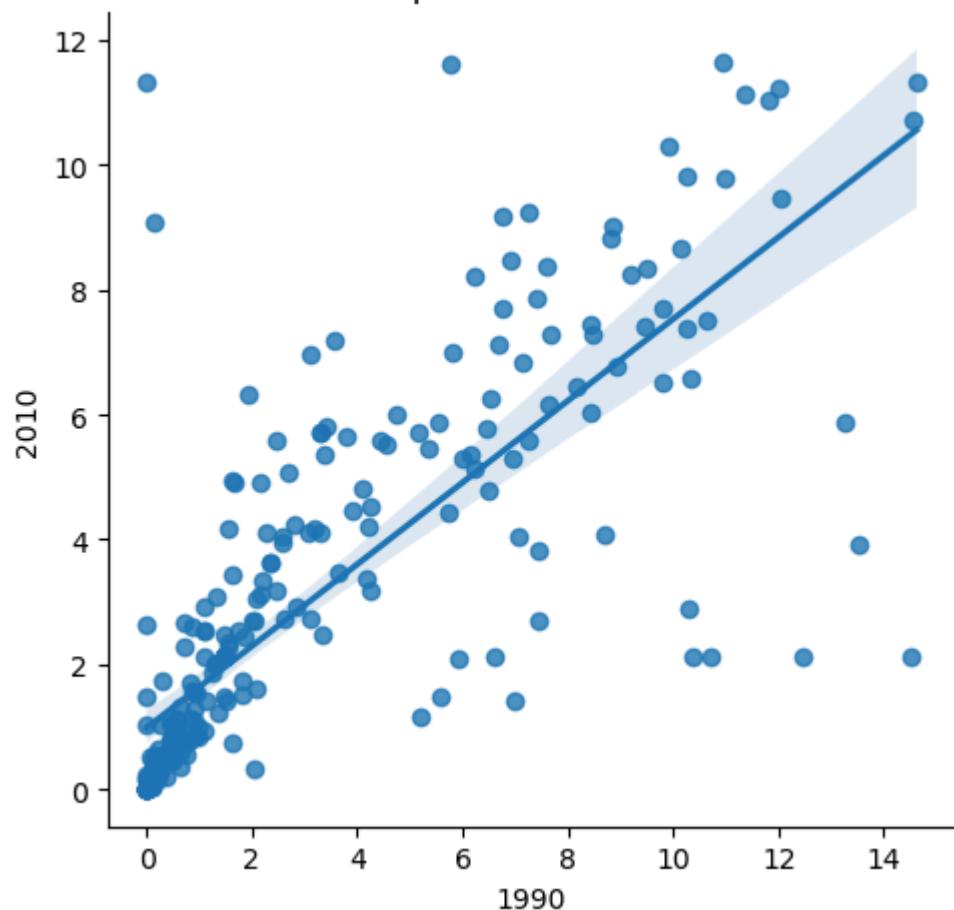
Scaterplot of 1990 vs 2009



Corelation between 1990 and 2009 : 0.7890708809076097

Corelation: Positively Corelated.

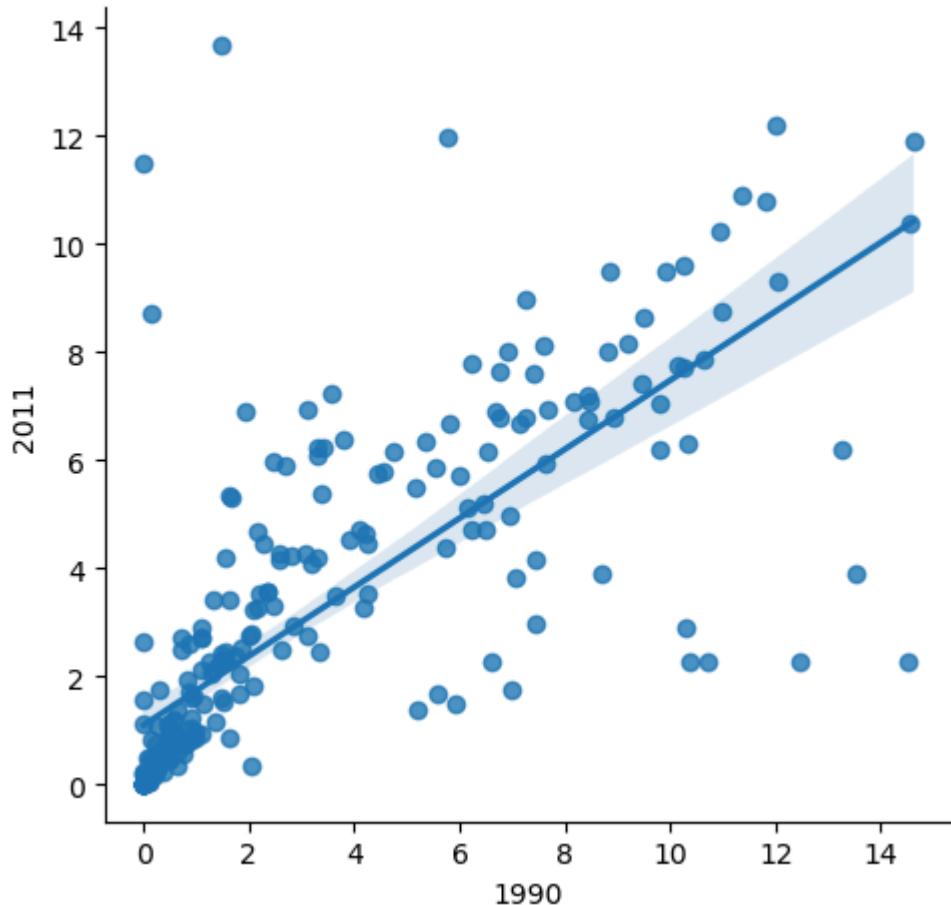
Scaterplot of 1990 vs 2010



Corelation between 1990 and 2010 : 0.7858574376352571

Corelation: Positively Corelated.

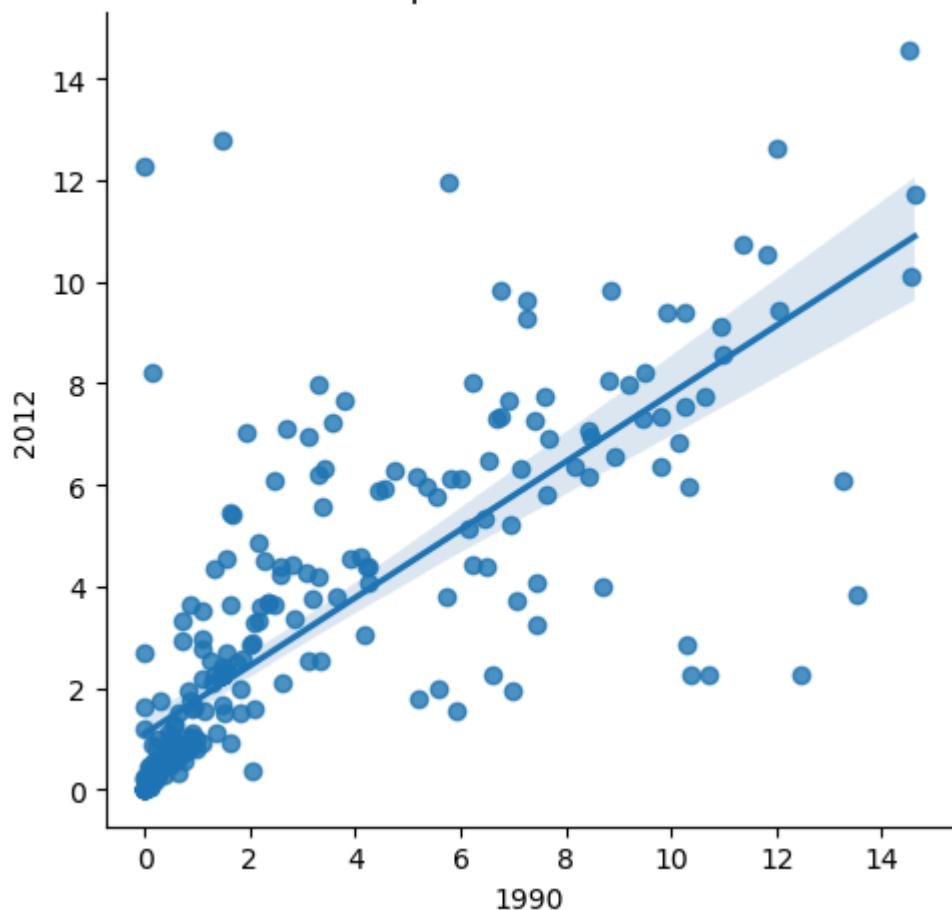
Scaterplot of 1990 vs 2011



Corelation between 1990 and 2011 : 0.7578040217701756

Corelation: Positively Corelated.

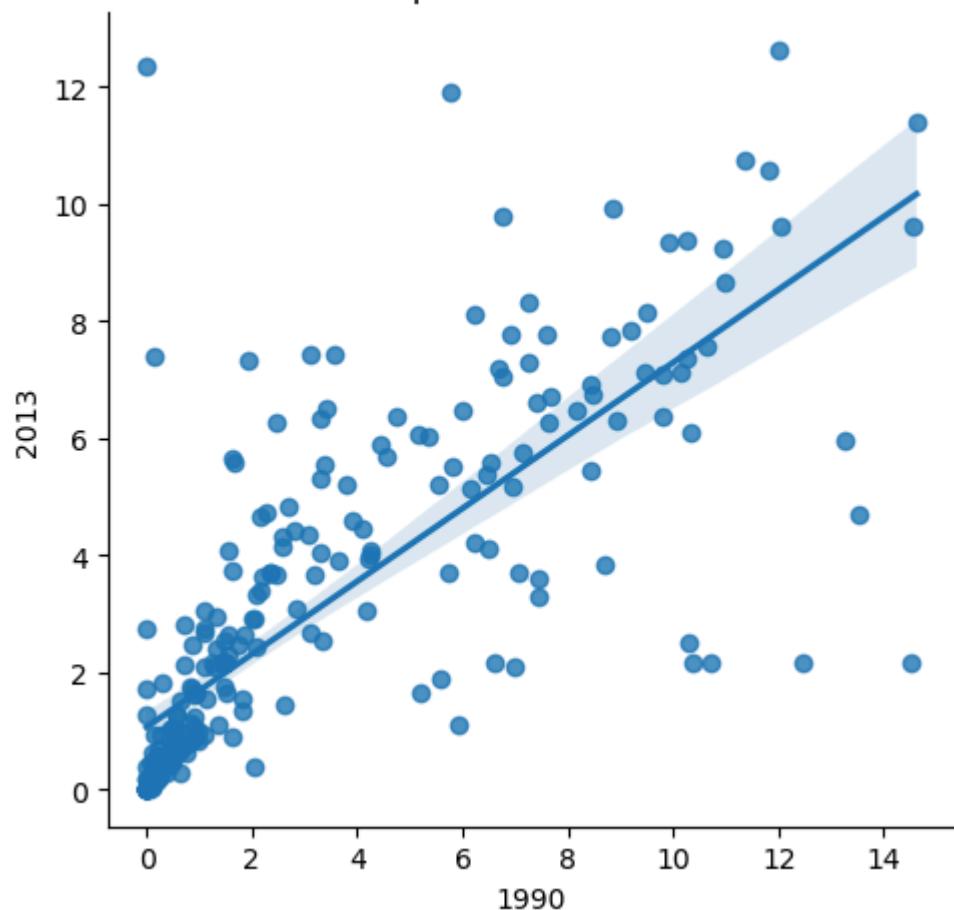
Scaterplot of 1990 vs 2012



Corelation between 1990 and 2012 : 0.7712005182487268

Corelation: Positively Corelated.

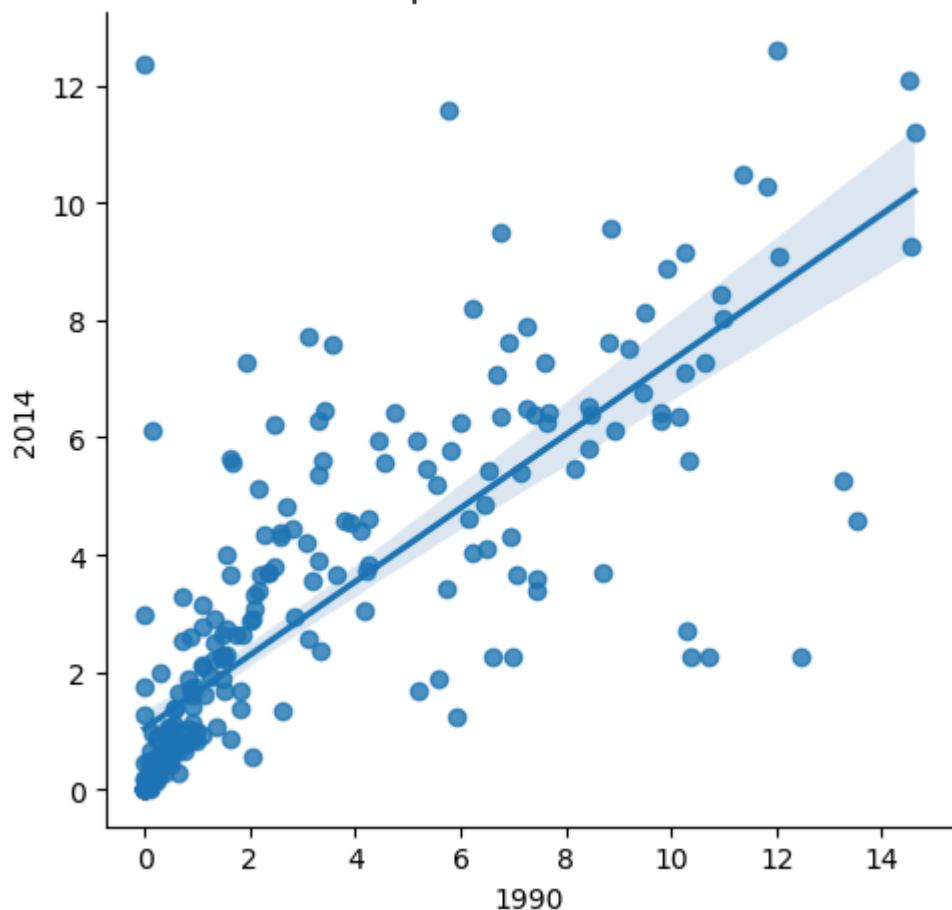
Scaterplot of 1990 vs 2013



Corelation between 1990 and 2013 : 0.7702416907149162

Corelation: Positively Corelated.

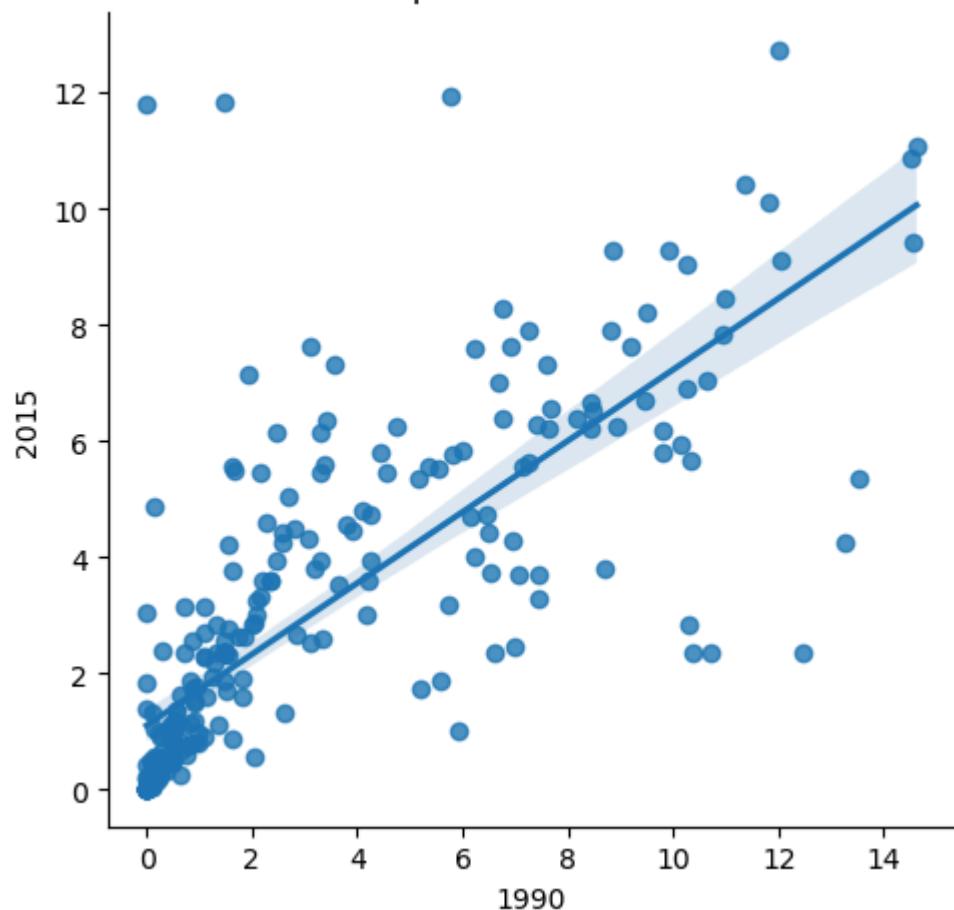
Scaterplot of 1990 vs 2014



Corelation between 1990 and 2014 : 0.7879363305070912

Corelation: Positively Corelated.

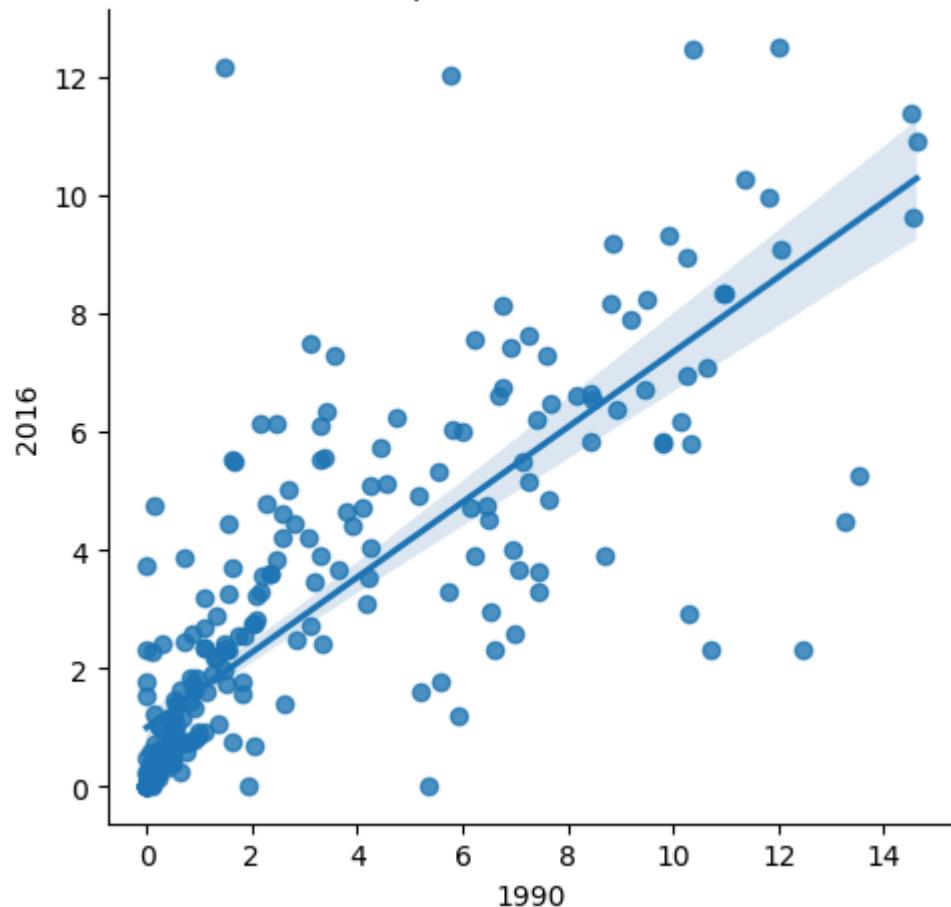
Scaterplot of 1990 vs 2015



Corelation between 1990 and 2015 : 0.7712938444660059

Corelation: Positively Corelated.

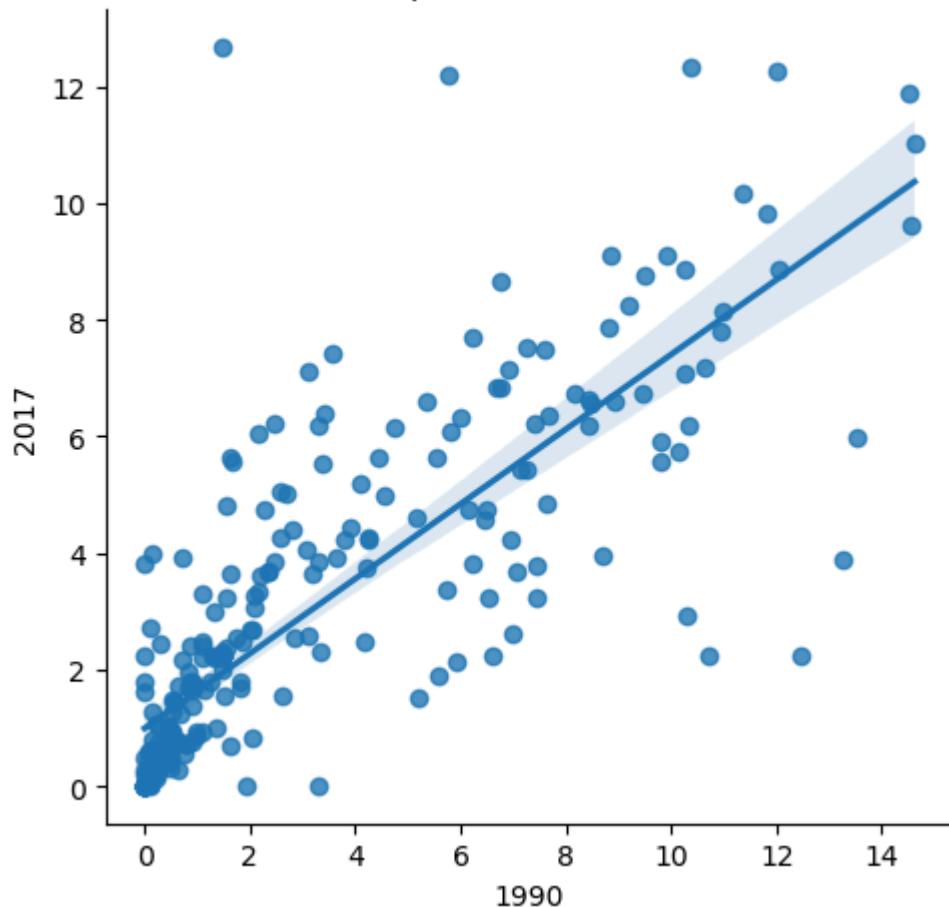
Scaterplot of 1990 vs 2016



Corelation between 1990 and 2016 : 0.8005176525893157

Corelation: Positively Corelated.

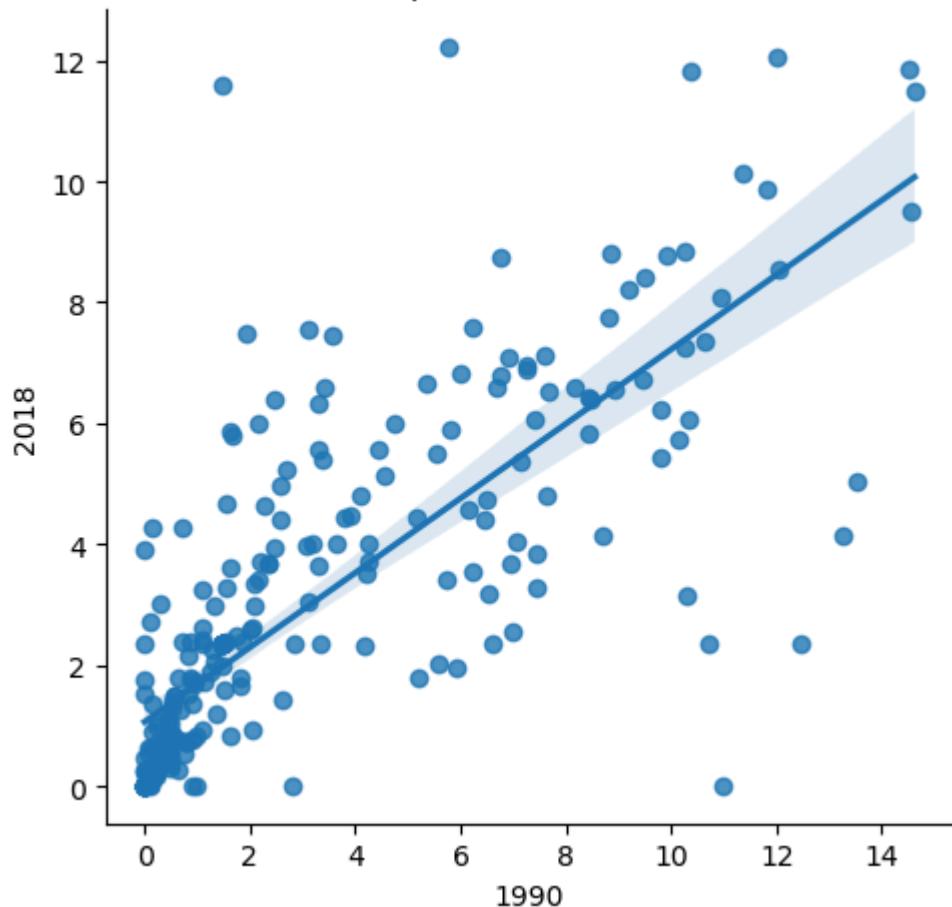
Scaterplot of 1990 vs 2017



Corelation between 1990 and 2017 : 0.8035979153307716

Corelation: Positively Corelated.

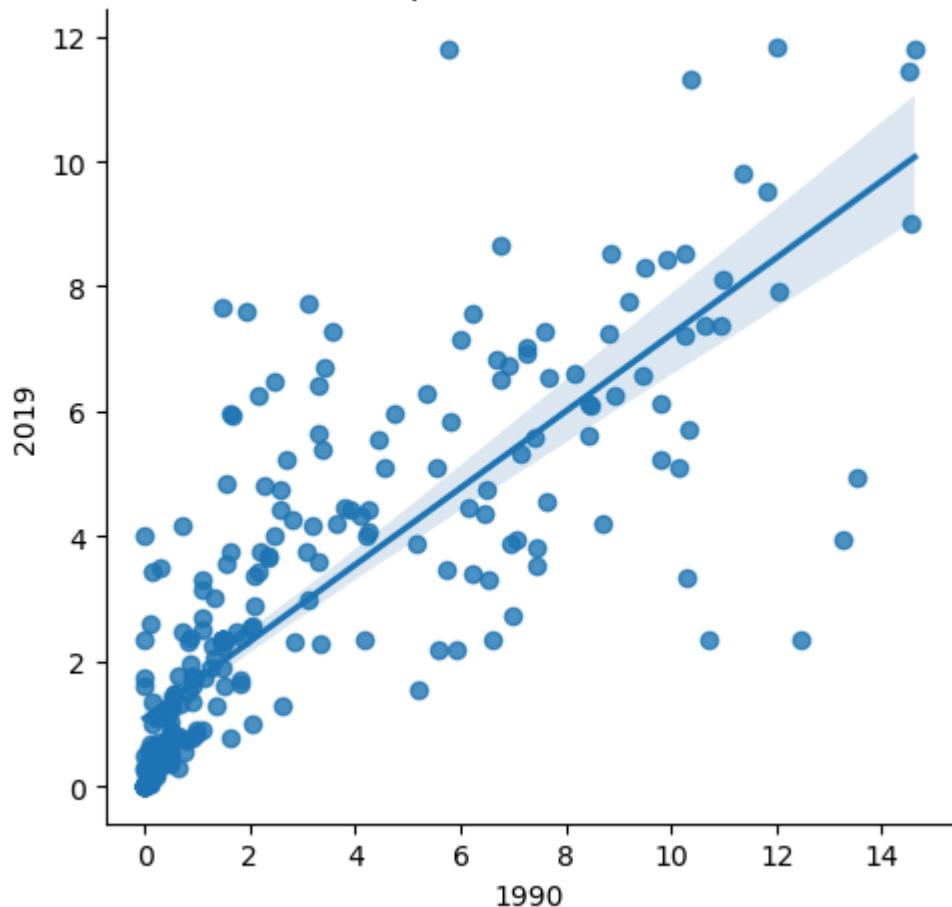
Scaterplot of 1990 vs 2018



Corelation between 1990 and 2018 : 0.7787100444723704

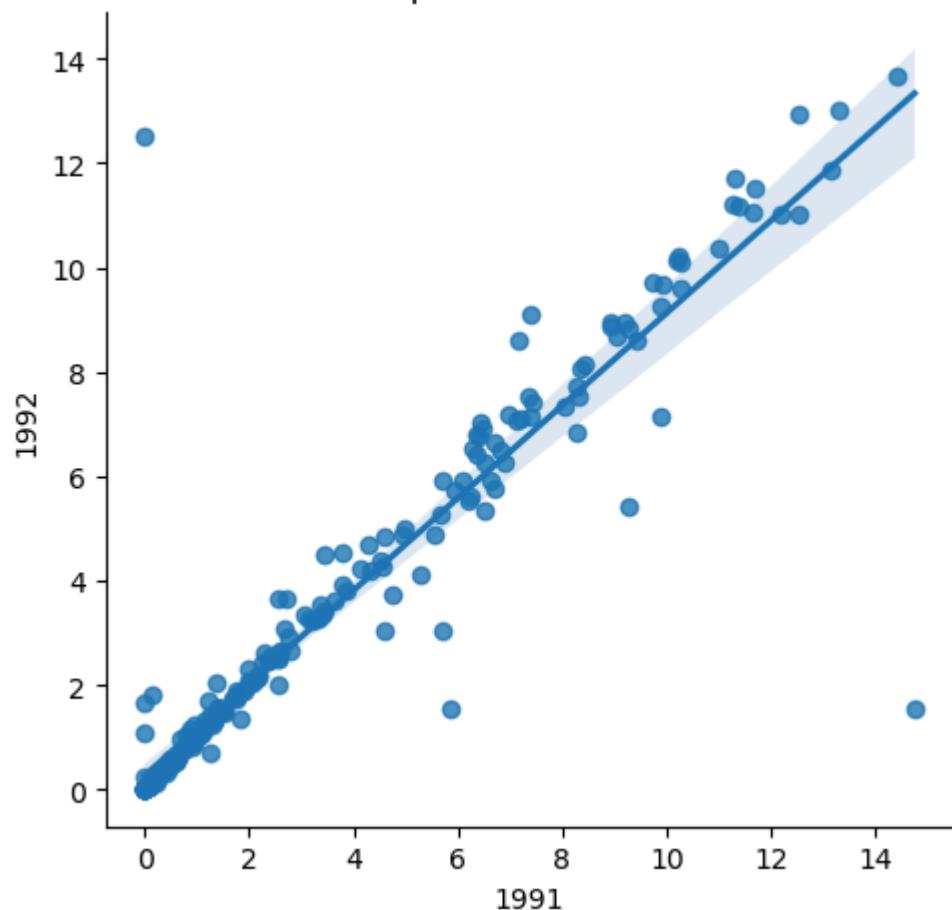
Corelation: Positively Corelated.

Scaterplot of 1990 vs 2019



Corelation between 1990 and 2019 : 0.8038556895588912

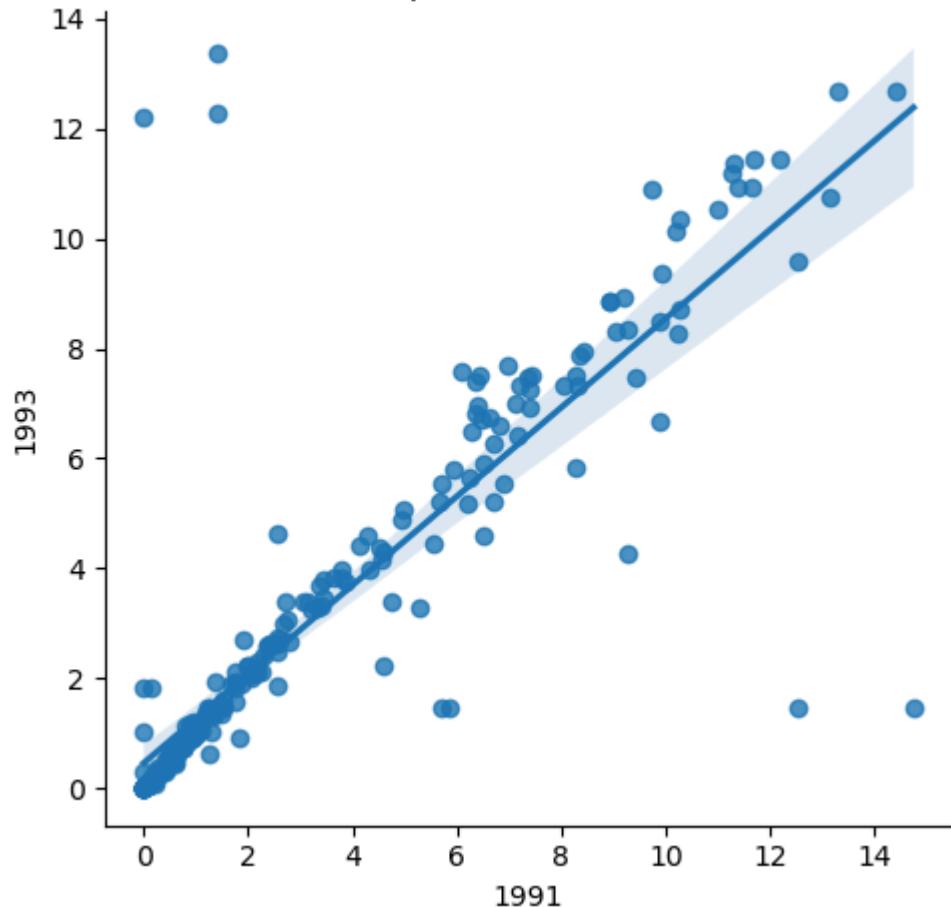
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1992

Corelation between 1991 and 1992 : 0.9364029098777341

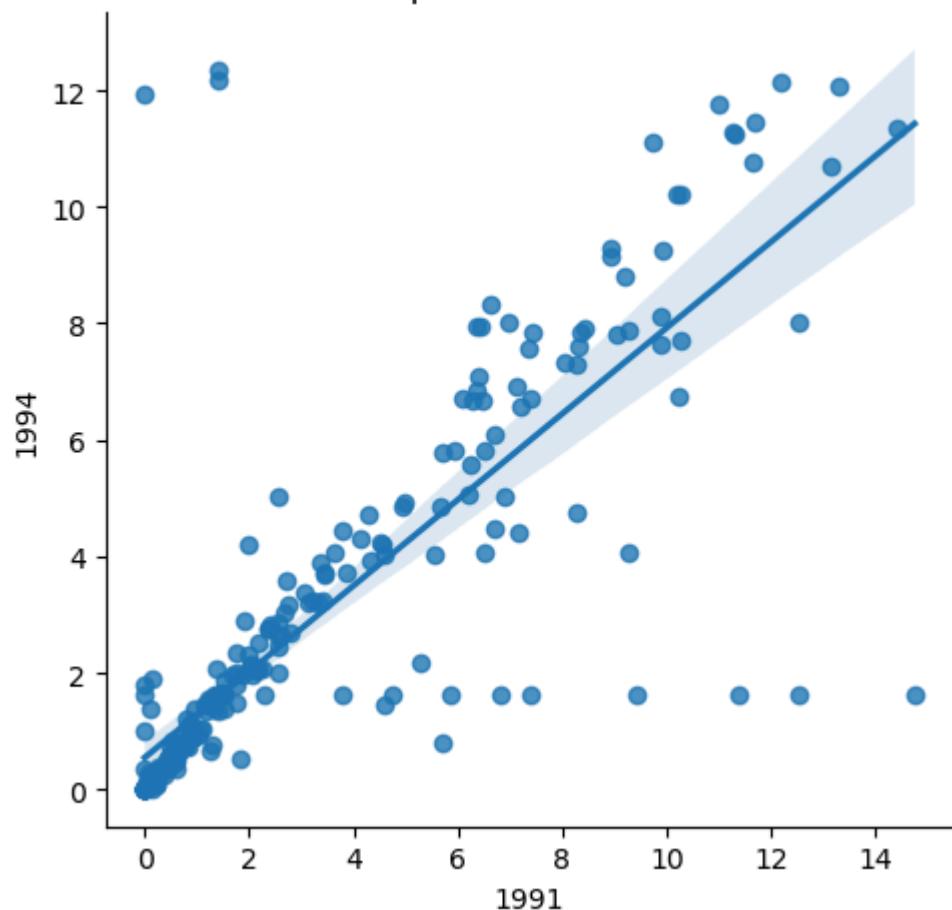
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1993



Corelation between 1991 and 1993 : 0.8656412707960368

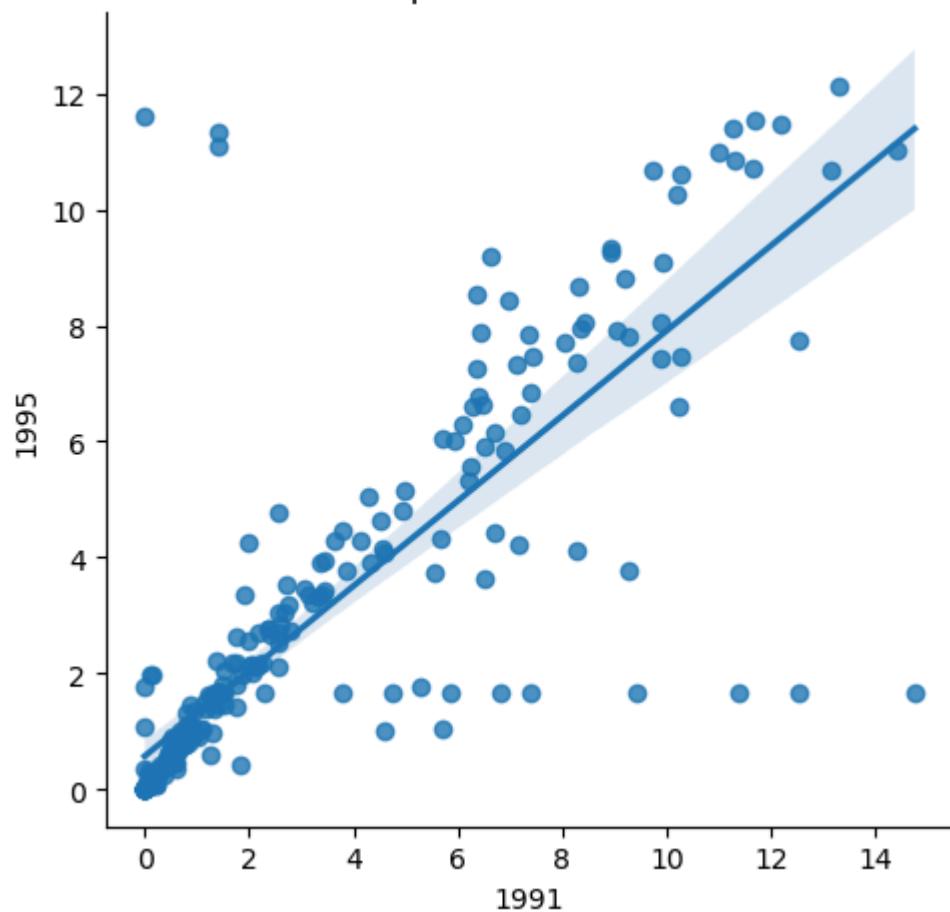
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1994

Corelation between 1991 and 1994 : 0.8200253489053791

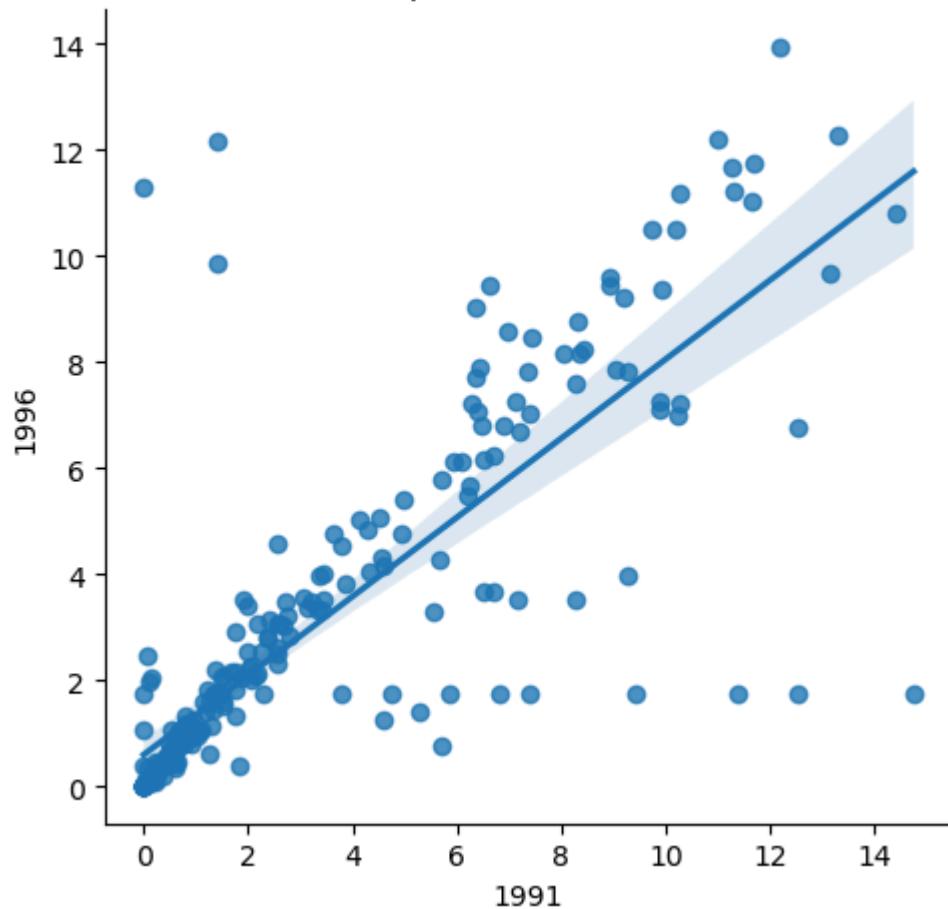
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1995



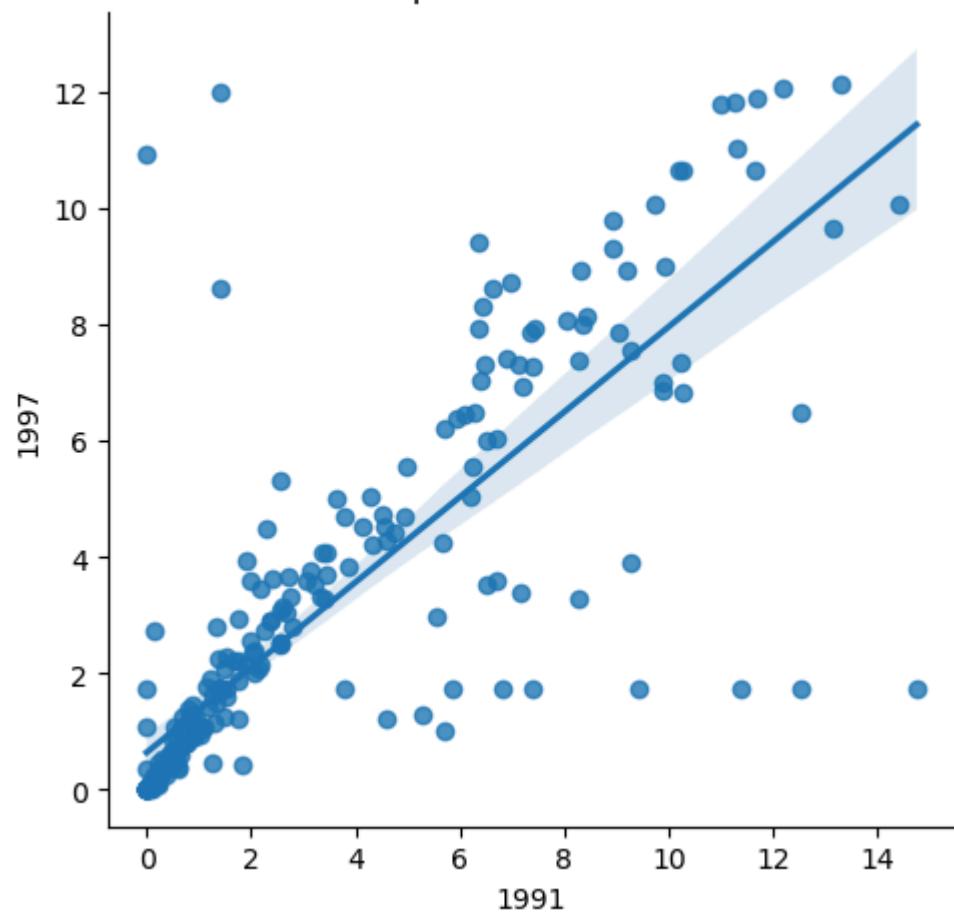
Corelation between 1991 and 1995 : 0.8231388599952866

Corelation: Positively Corelated.

Scaterplot of 1991 vs 1996

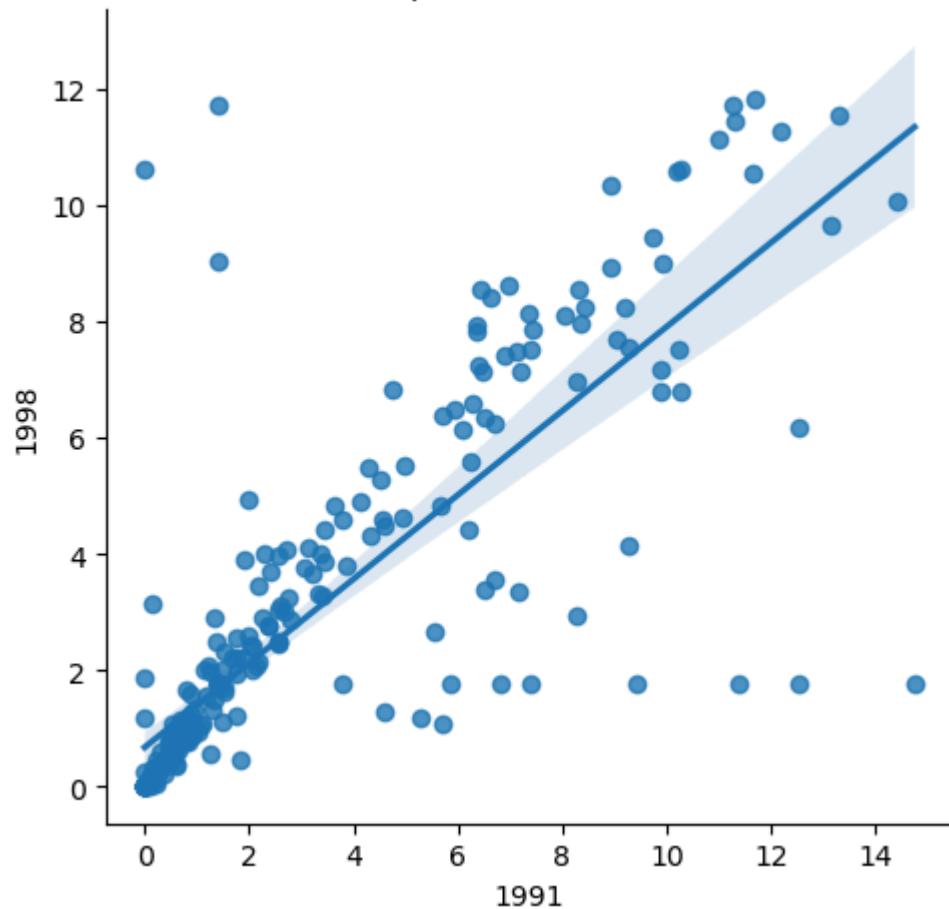
Corelation between 1991 and 1996 : 0.8191886926046017

Corelation: Positively Corelated.

Scaterplot of 1991 vs 1997

Corelation between 1991 and 1997 : 0.8186171335308724

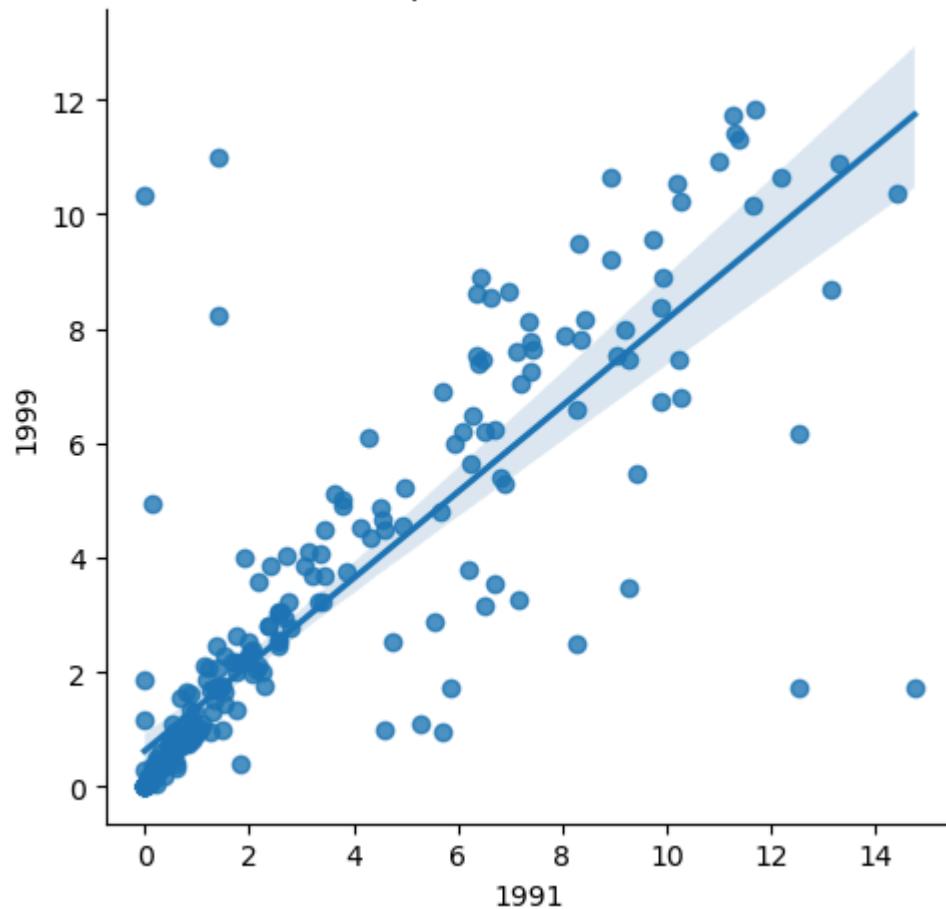
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1998

Corelation between 1991 and 1998 : 0.8173358970067822

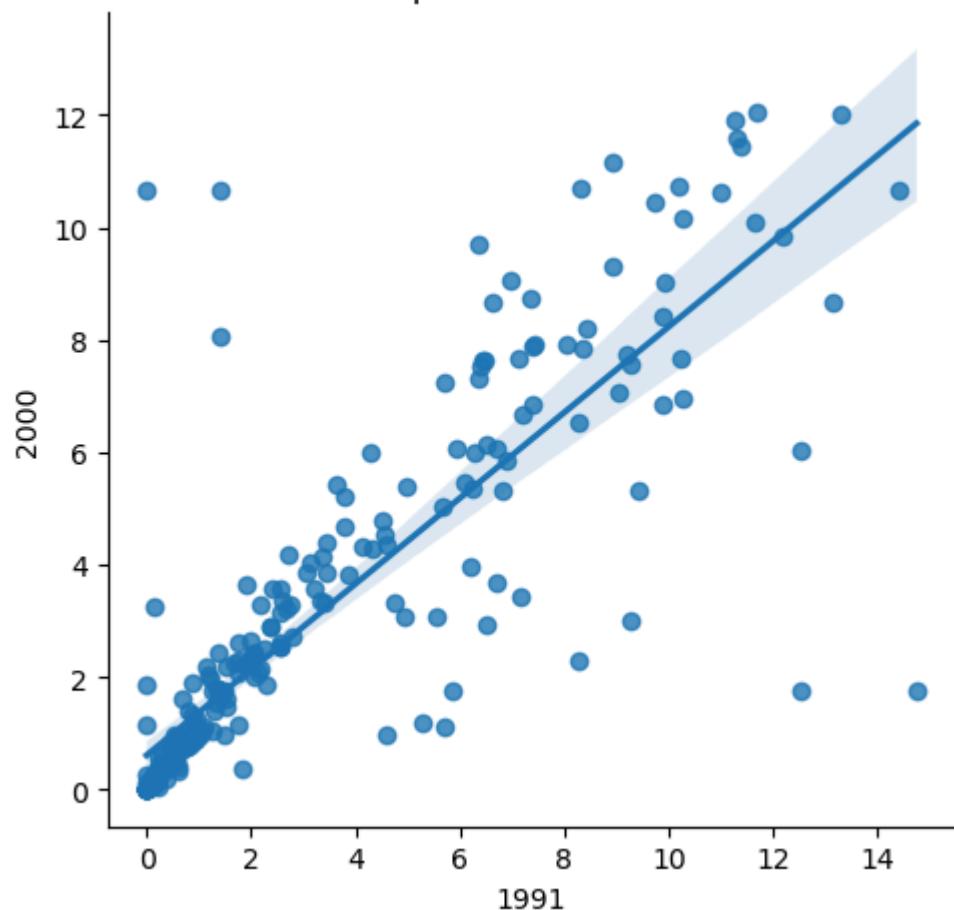
Corelation: Positively Corelated.

Scaterplot of 1991 vs 1999



Corelation between 1991 and 1999 : 0.8473032918457535

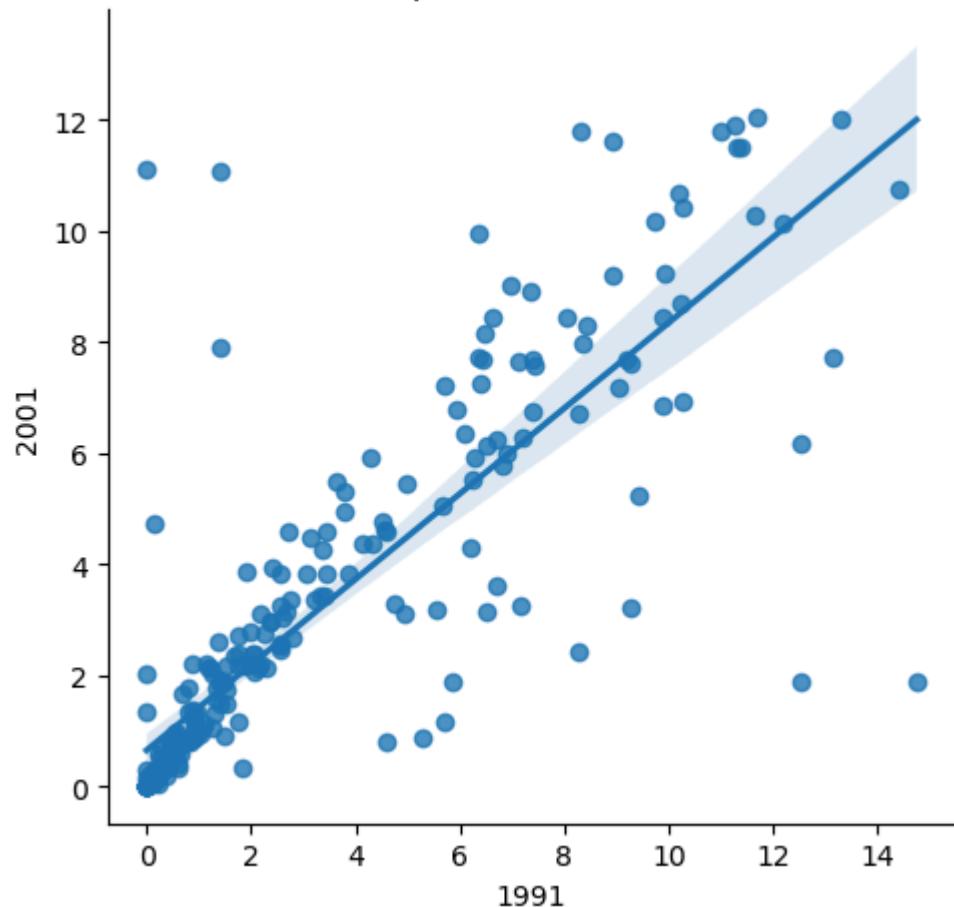
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2000

Corelation between 1991 and 2000 : 0.8474895009919704

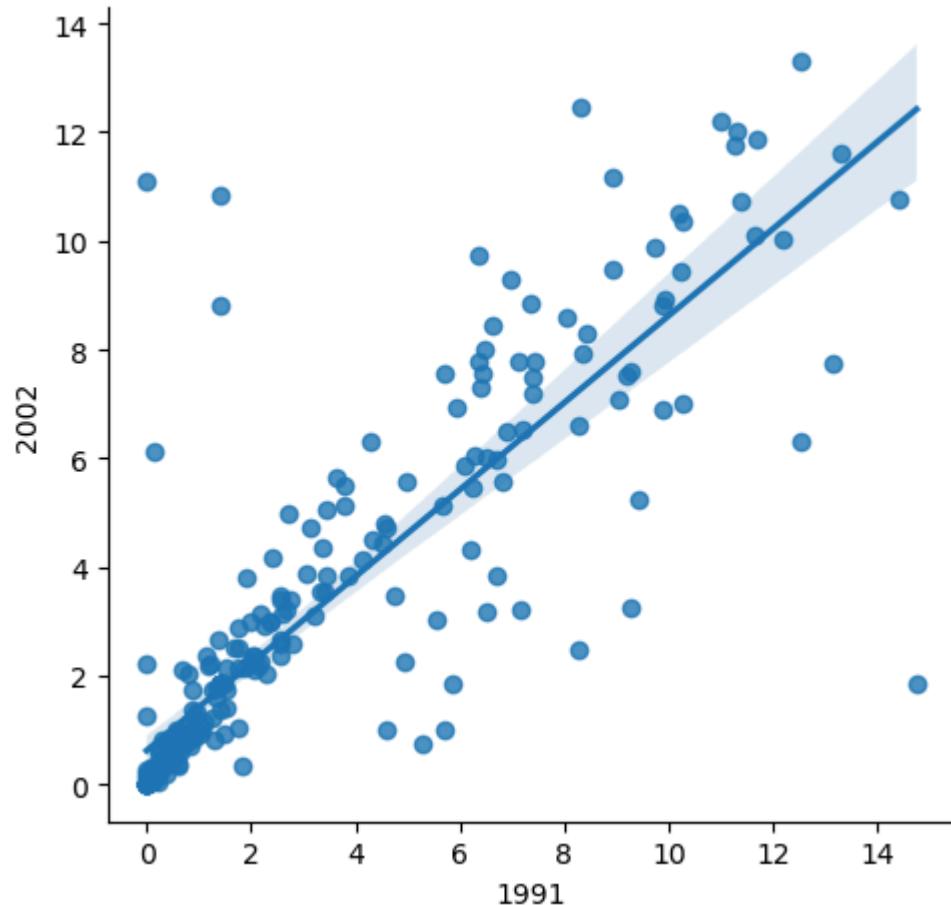
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2001



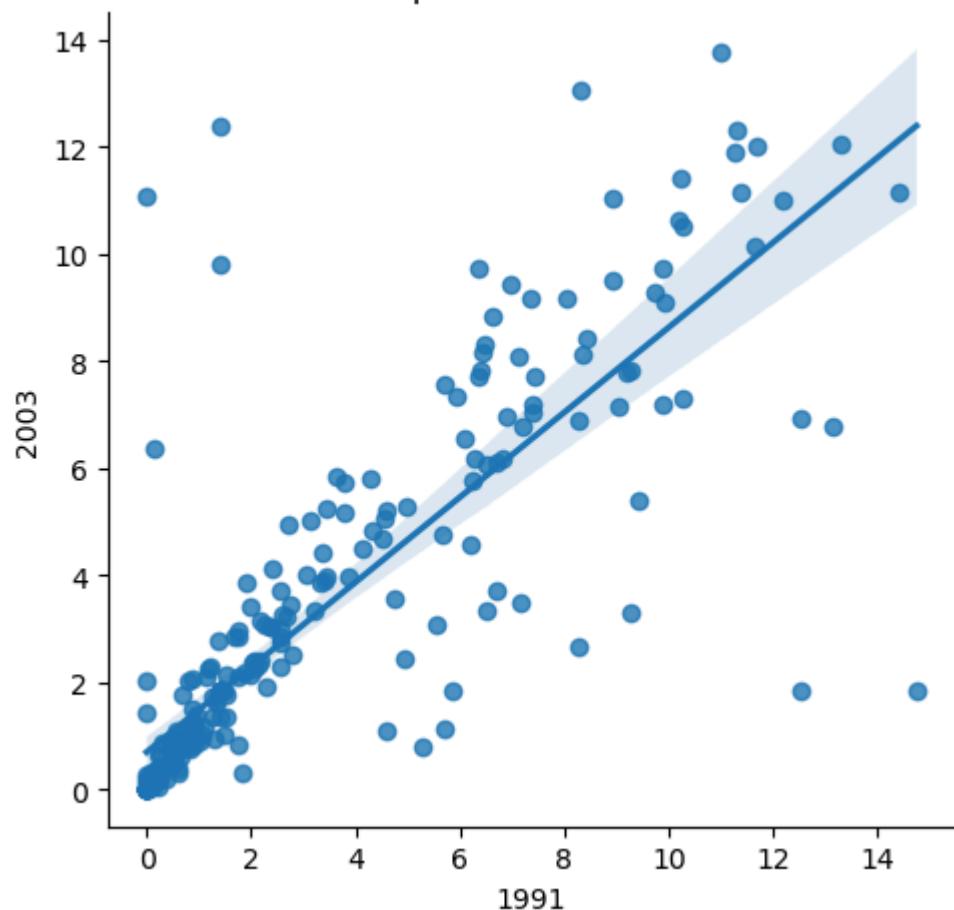
Corelation between 1991 and 2001 : 0.8416686657260539

Corelation: Positively Corelated.

Scaterplot of 1991 vs 2002

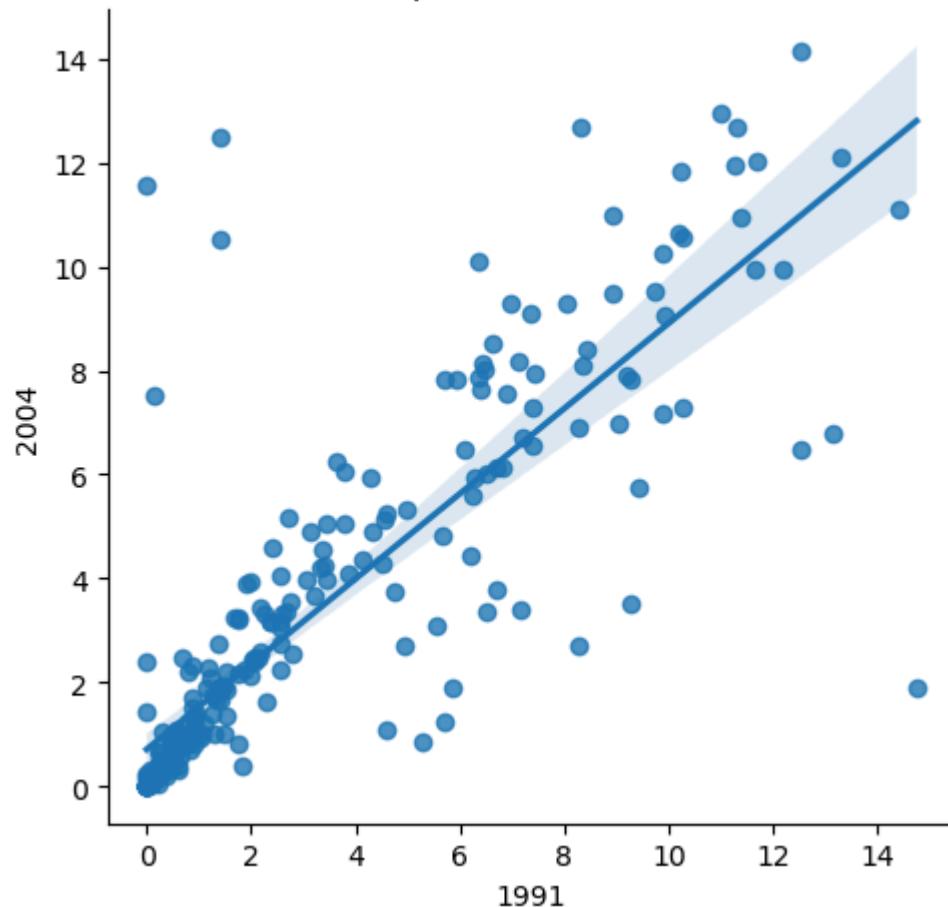
Corelation between 1991 and 2002 : 0.8550443894548032

Corelation: Positively Corelated.

Scaterplot of 1991 vs 2003

Corelation between 1991 and 2003 : 0.8310683203914986

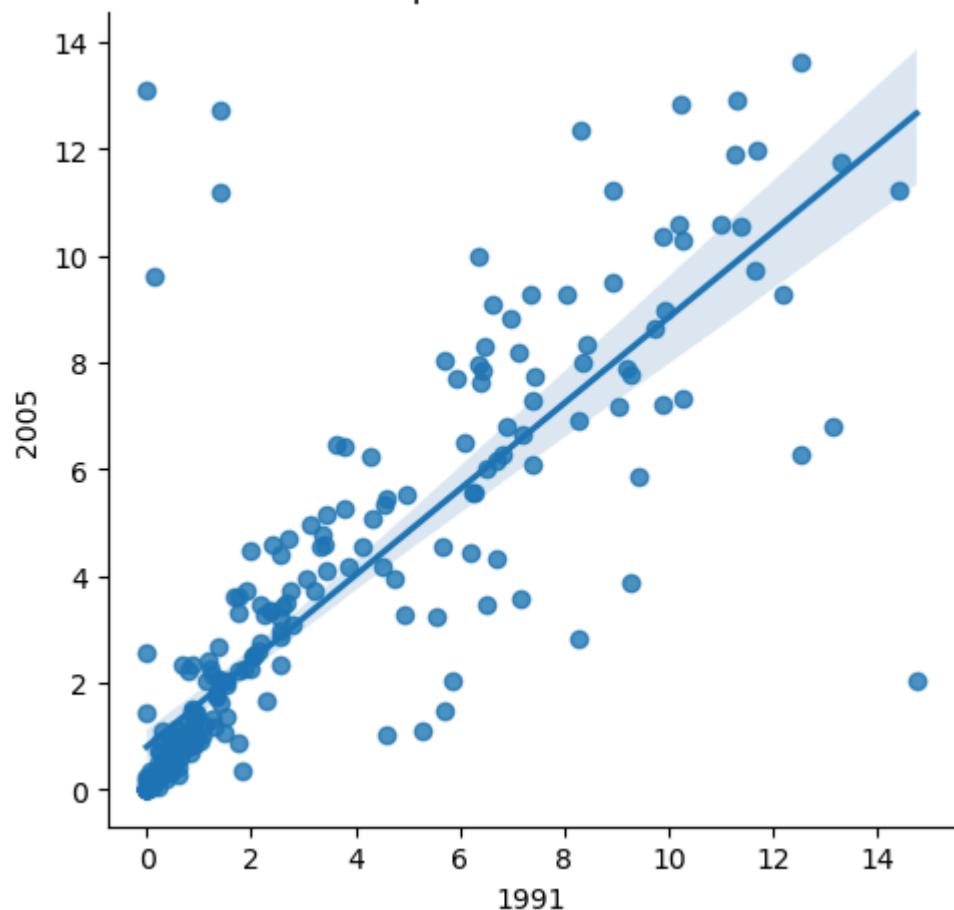
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2004

Corelation between 1991 and 2004 : 0.8421648780408278

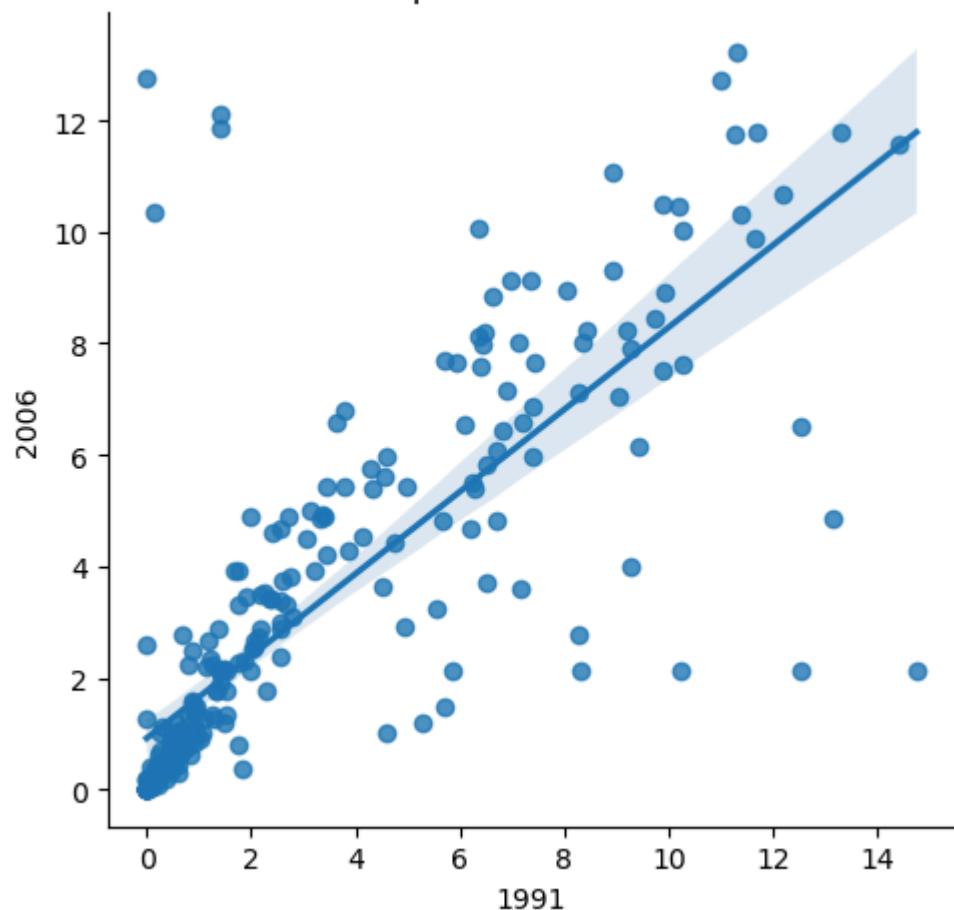
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2005



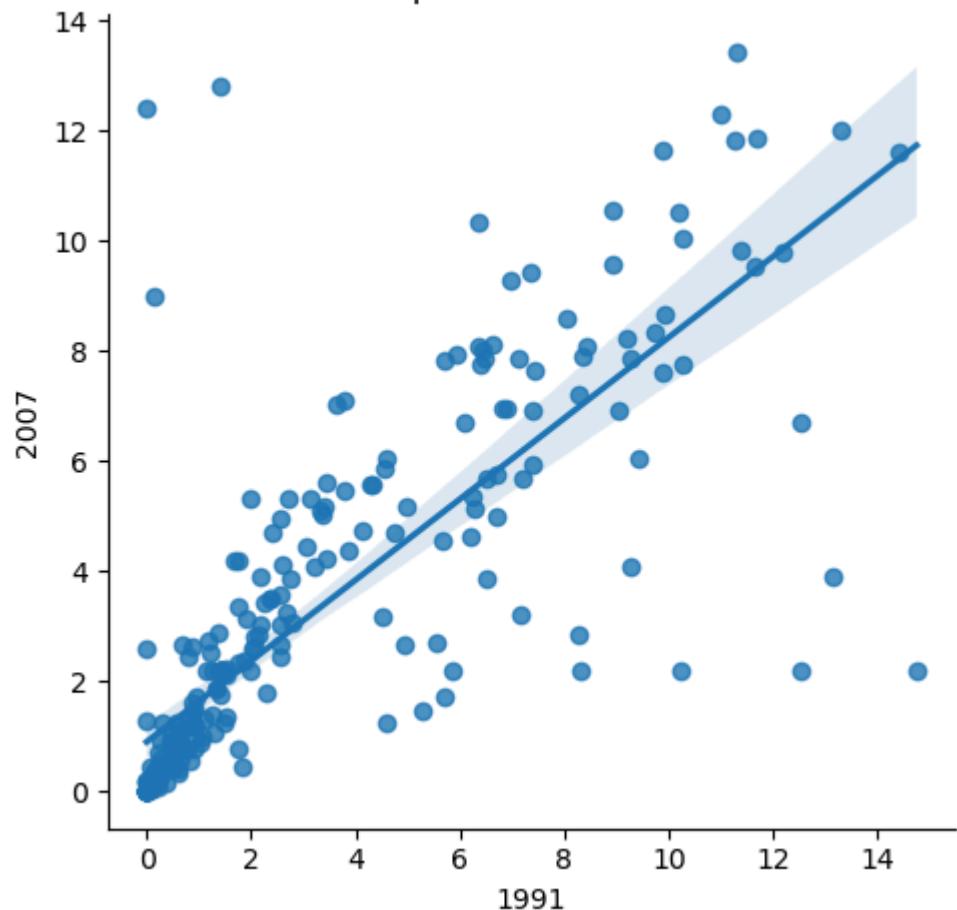
Corelation between 1991 and 2005 : 0.8283411107250394

Corelation: Positively Corelated.

Scaterplot of 1991 vs 2006

Corelation between 1991 and 2006 : 0.7875775287225801

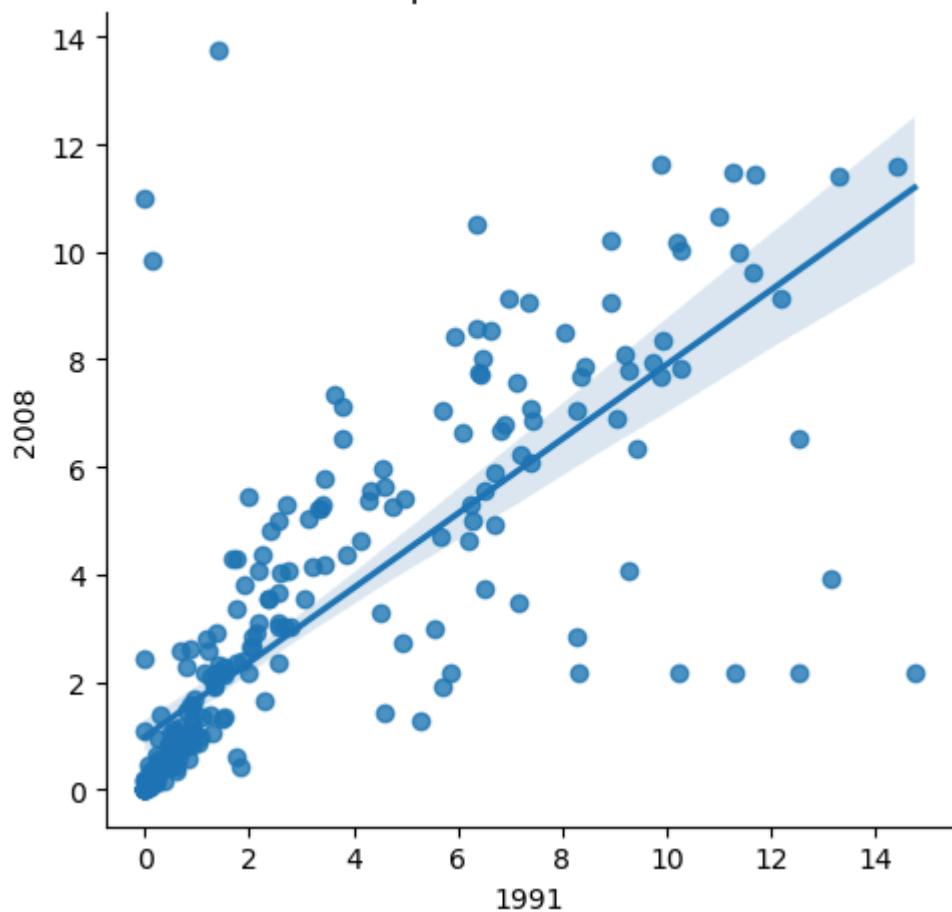
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2007

Corelation between 1991 and 2007 : 0.7981581644732106

Corelation: Positively Corelated.

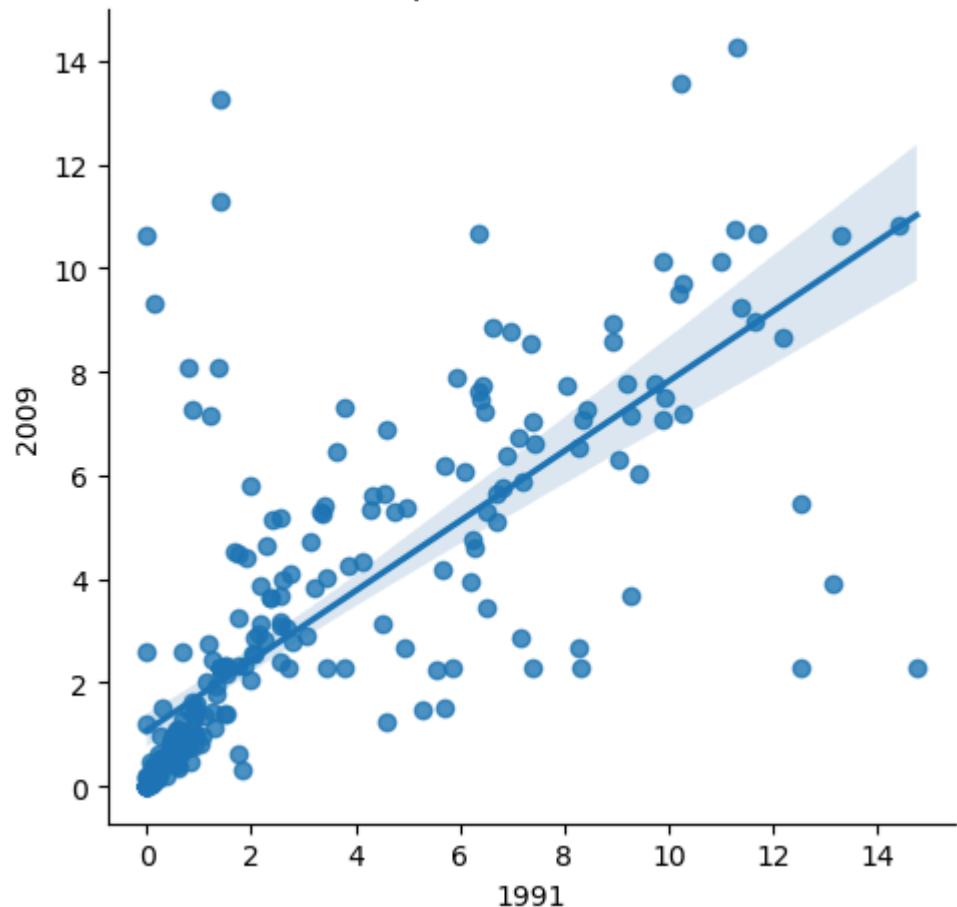
Scaterplot of 1991 vs 2008



Corelation between 1991 and 2008 : 0.7780188590331563

Corelation: Positively Corelated.

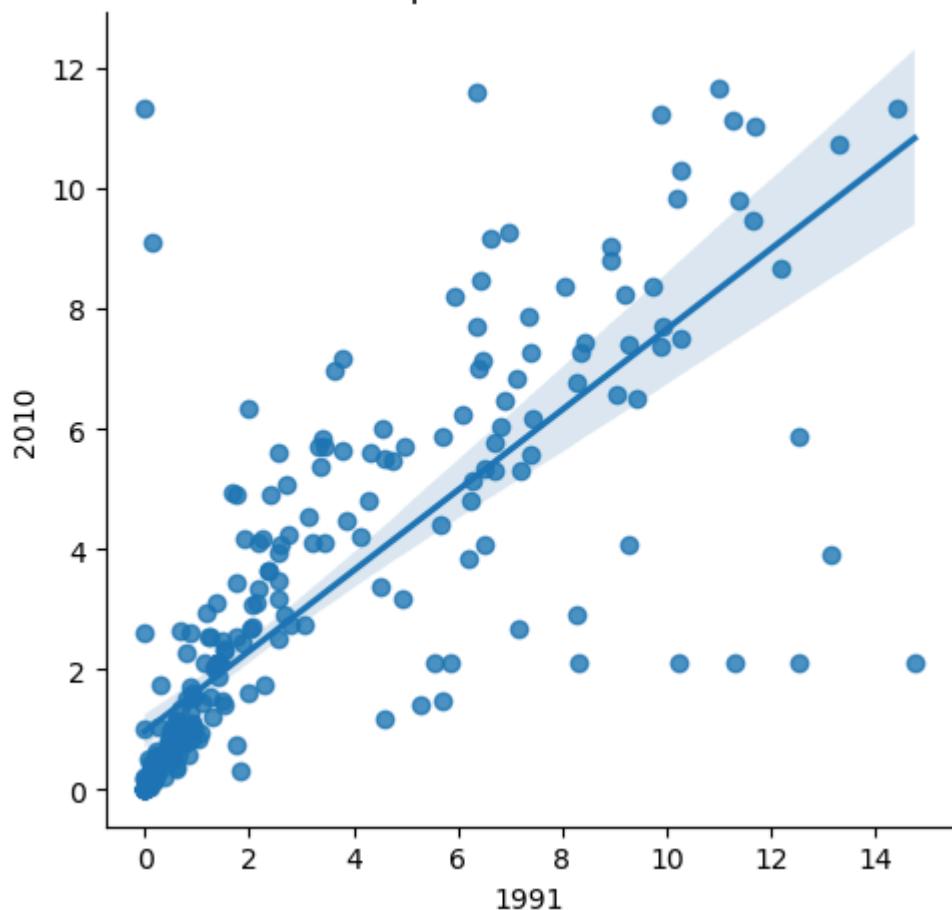
Scaterplot of 1991 vs 2009



Corelation between 1991 and 2009 : 0.7489400752422319

Corelation: Positively Corelated.

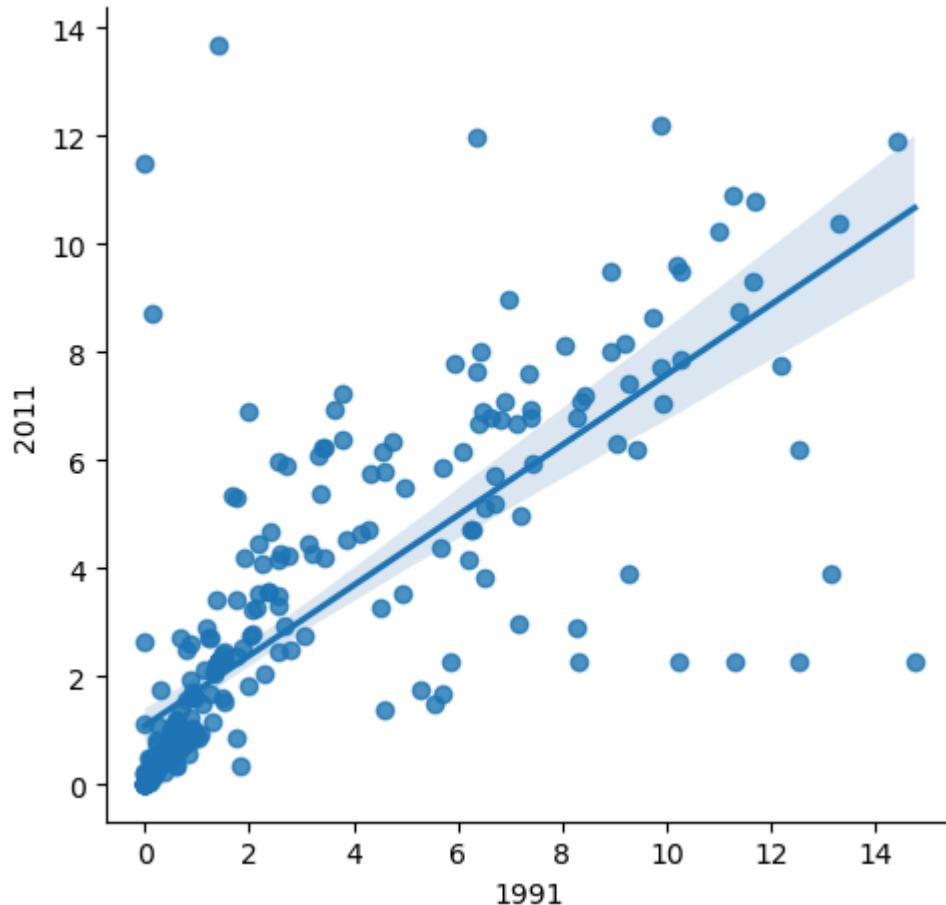
Scaterplot of 1991 vs 2010



Corelation between 1991 and 2010 : 0.787378392682215

Corelation: Positively Corelated.

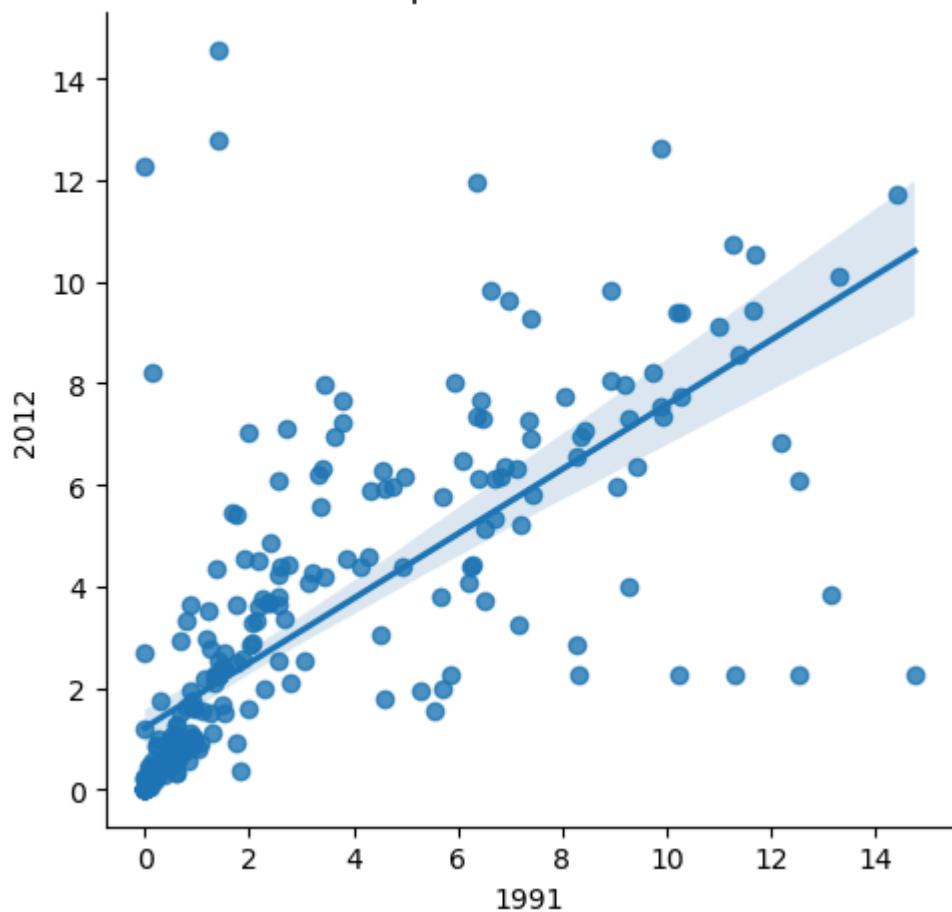
Scaterplot of 1991 vs 2011



Corelation between 1991 and 2011 : 0.7570004512914178

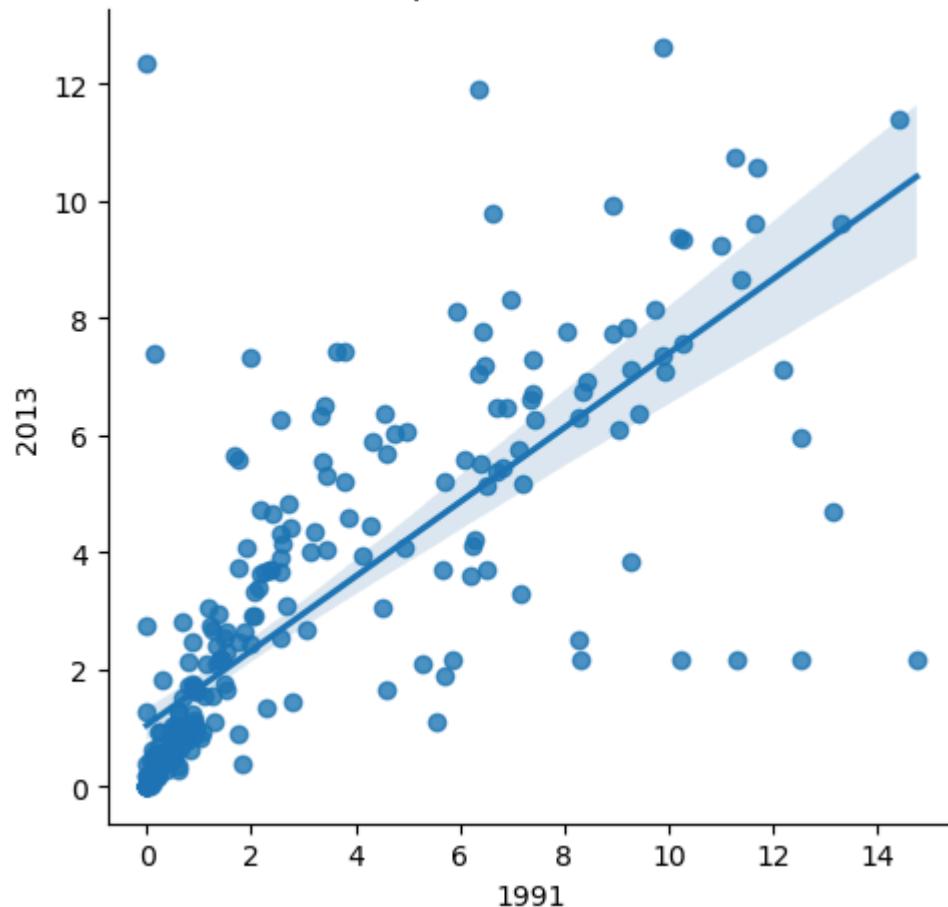
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2012



Corelation between 1991 and 2012 : 0.7184333731944774

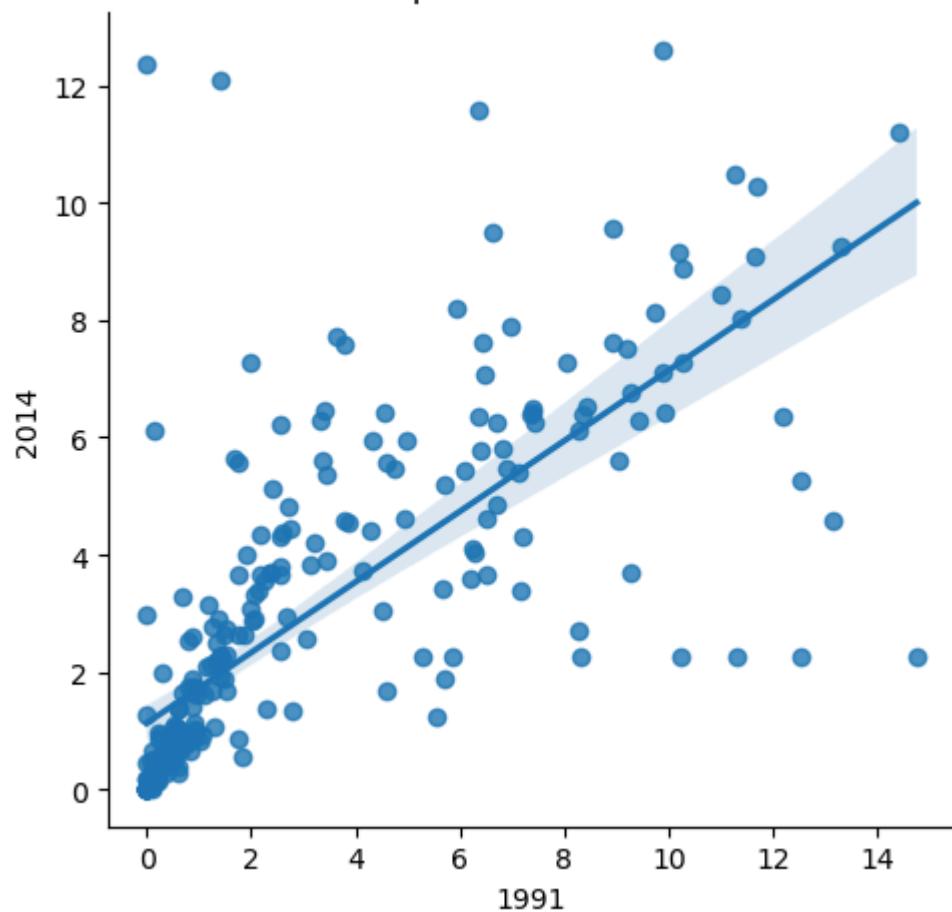
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2013

Corelation between 1991 and 2013 : 0.7702351588039609

Corelation: Positively Corelated.

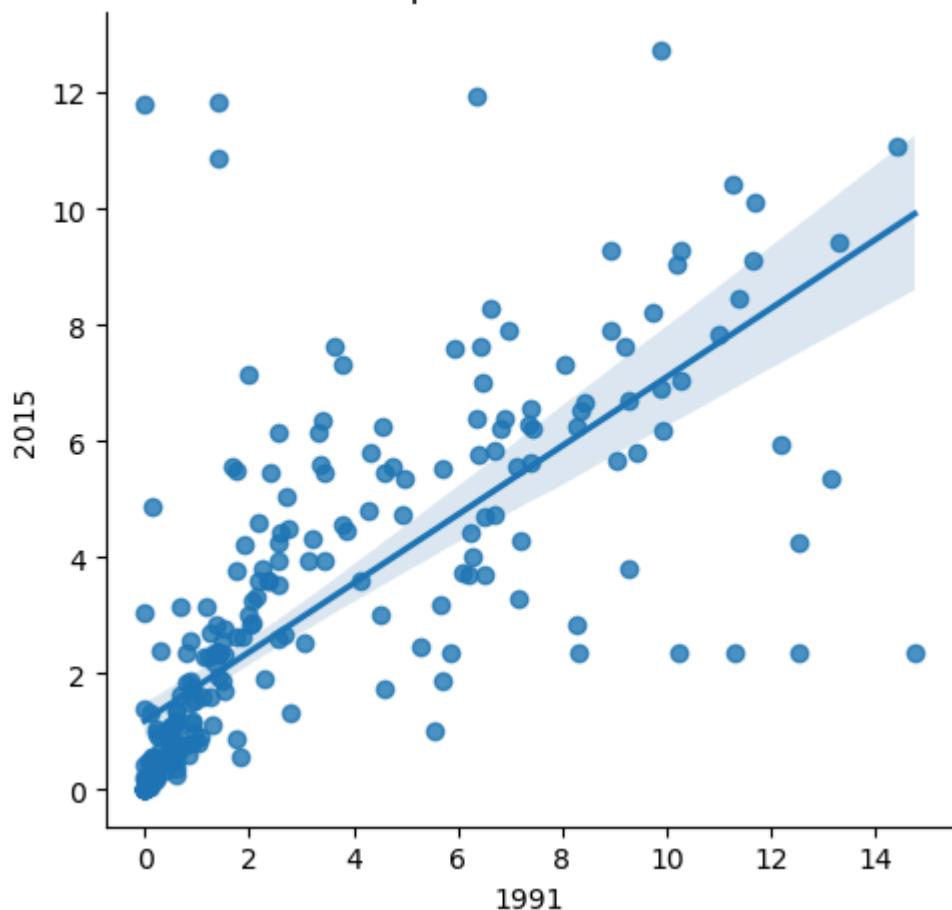
Scaterplot of 1991 vs 2014



Corelation between 1991 and 2014 : 0.7419929753659948

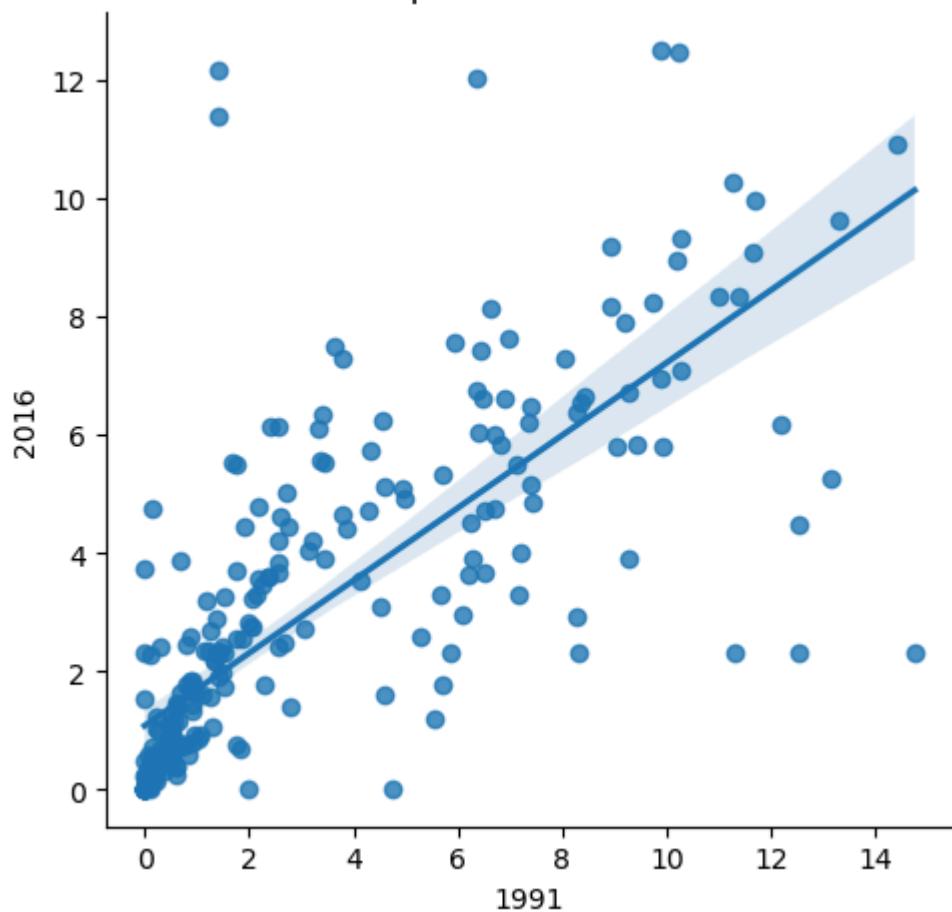
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2015



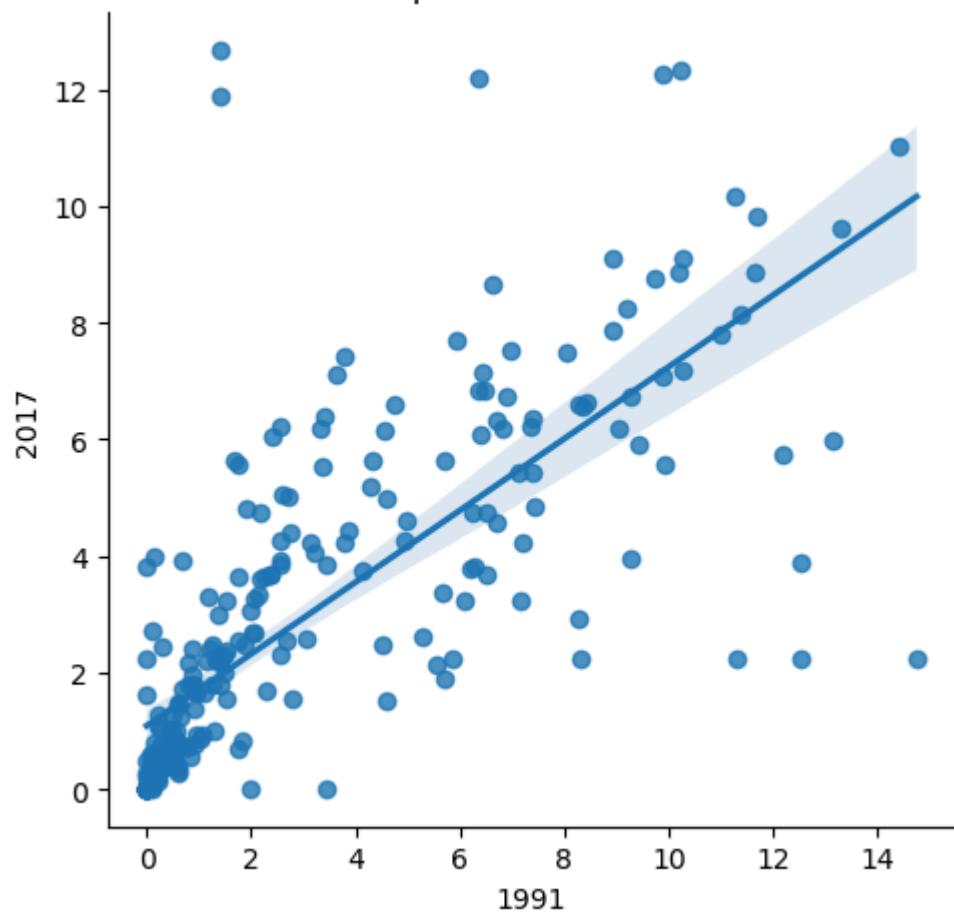
Corelation between 1991 and 2015 : 0.7304608102314181

Corelation: Positively Corelated.

Scaterplot of 1991 vs 2016

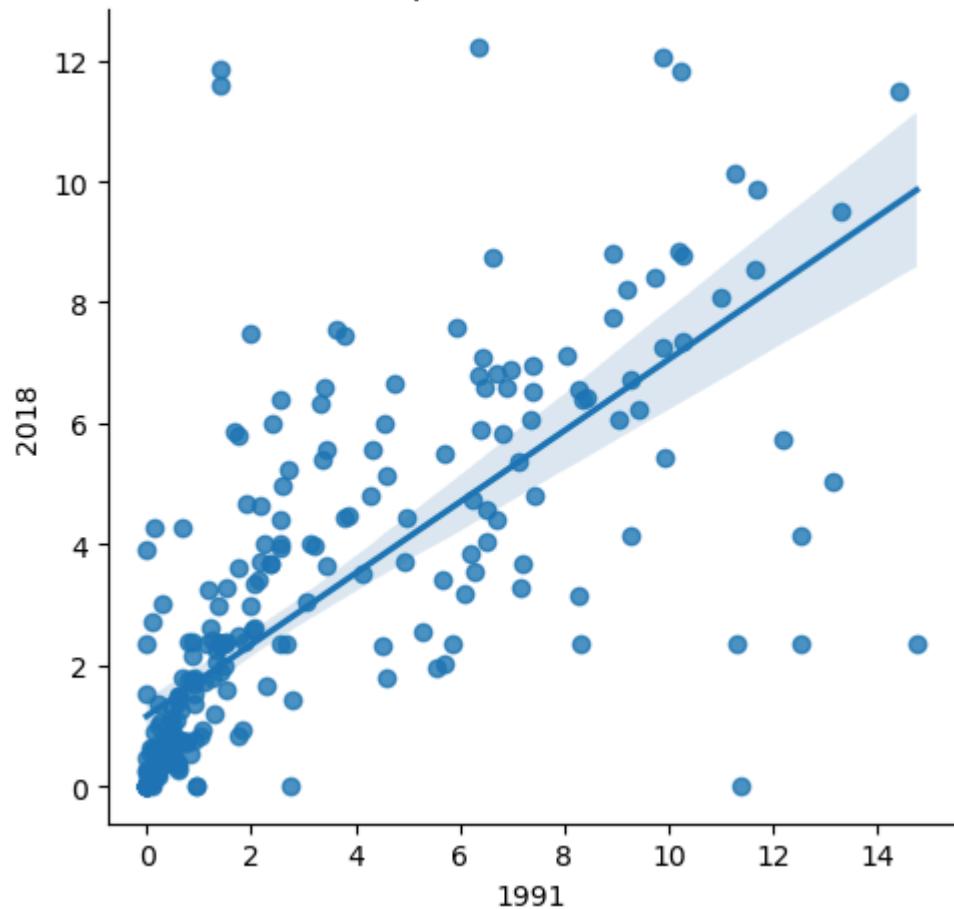
Corelation between 1991 and 2016 : 0.7586189153891547

Corelation: Positively Corelated.

Scaterplot of 1991 vs 2017

Corelation between 1991 and 2017 : 0.7561304519560591

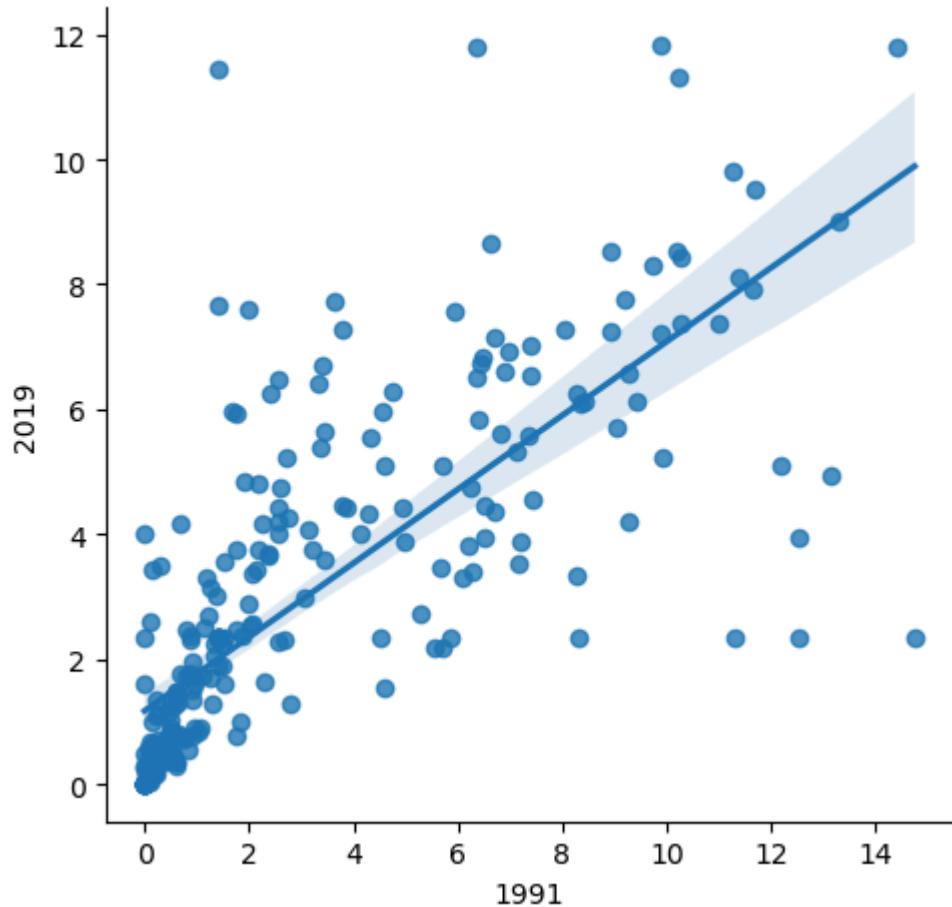
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2018

Corelation between 1991 and 2018 : 0.7307962934039642

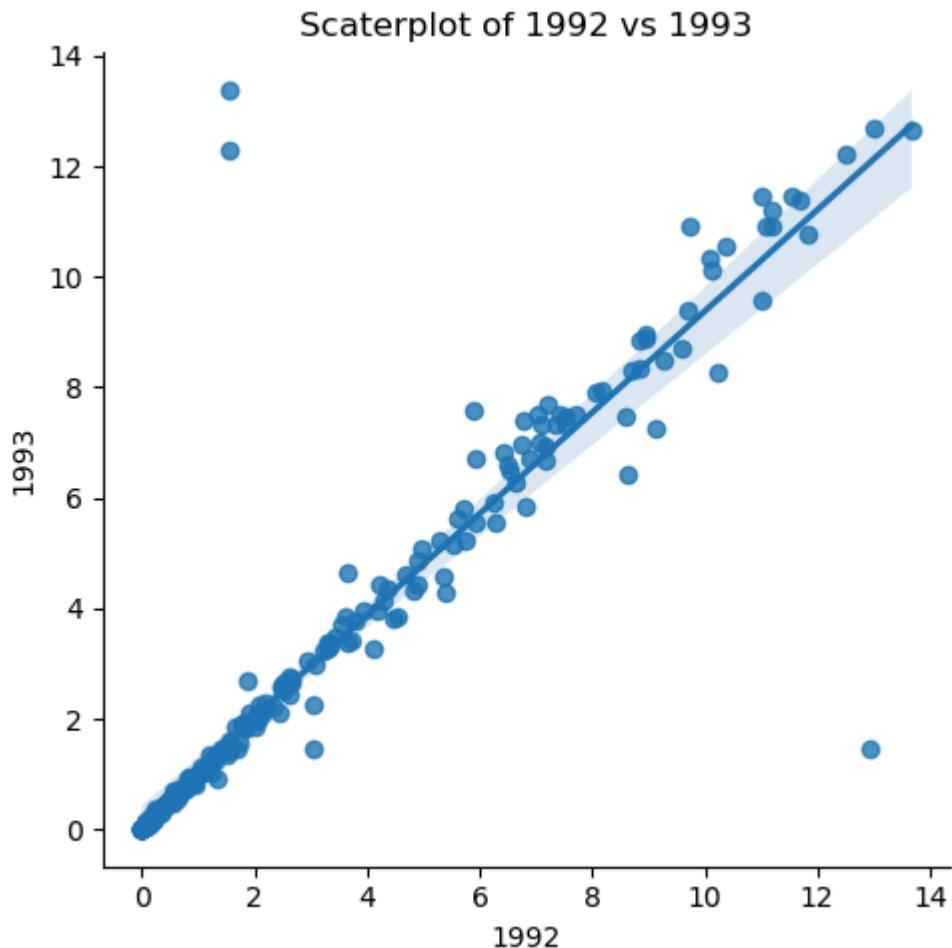
Corelation: Positively Corelated.

Scaterplot of 1991 vs 2019



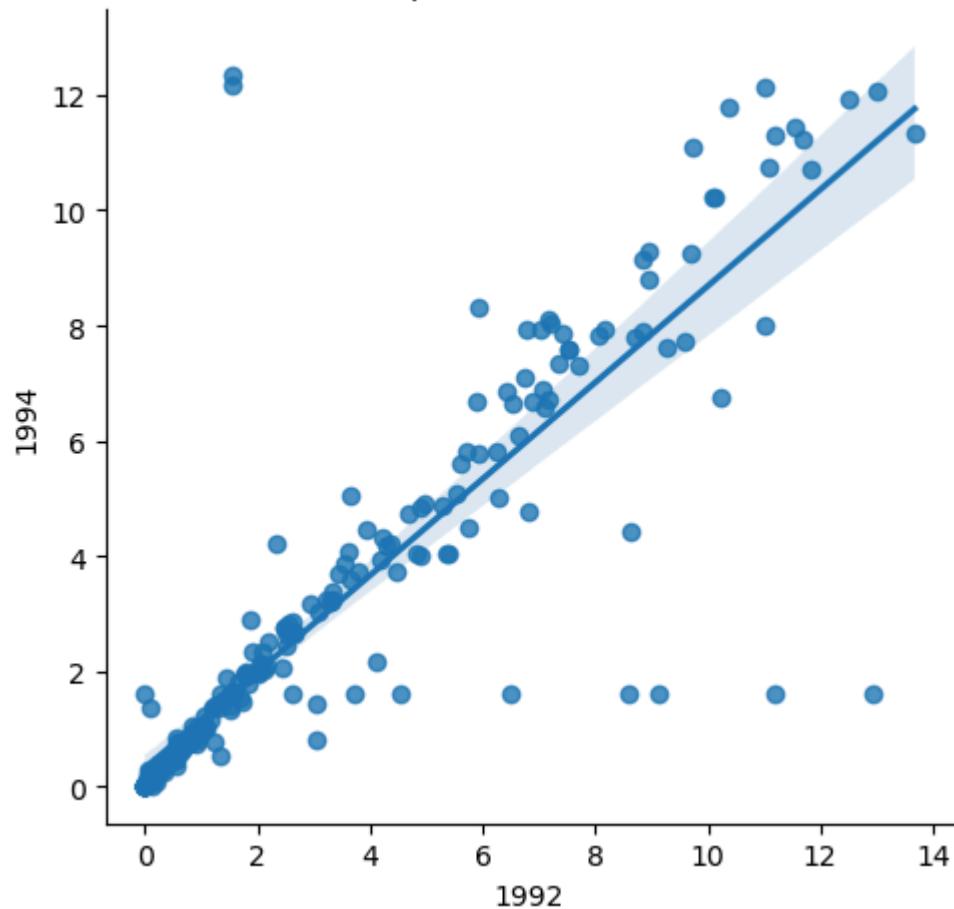
Corelation between 1991 and 2019 : 0.7580498126530658

Corelation: Positively Corelated.



Corelation between 1992 and 1993 : 0.9293374018481277

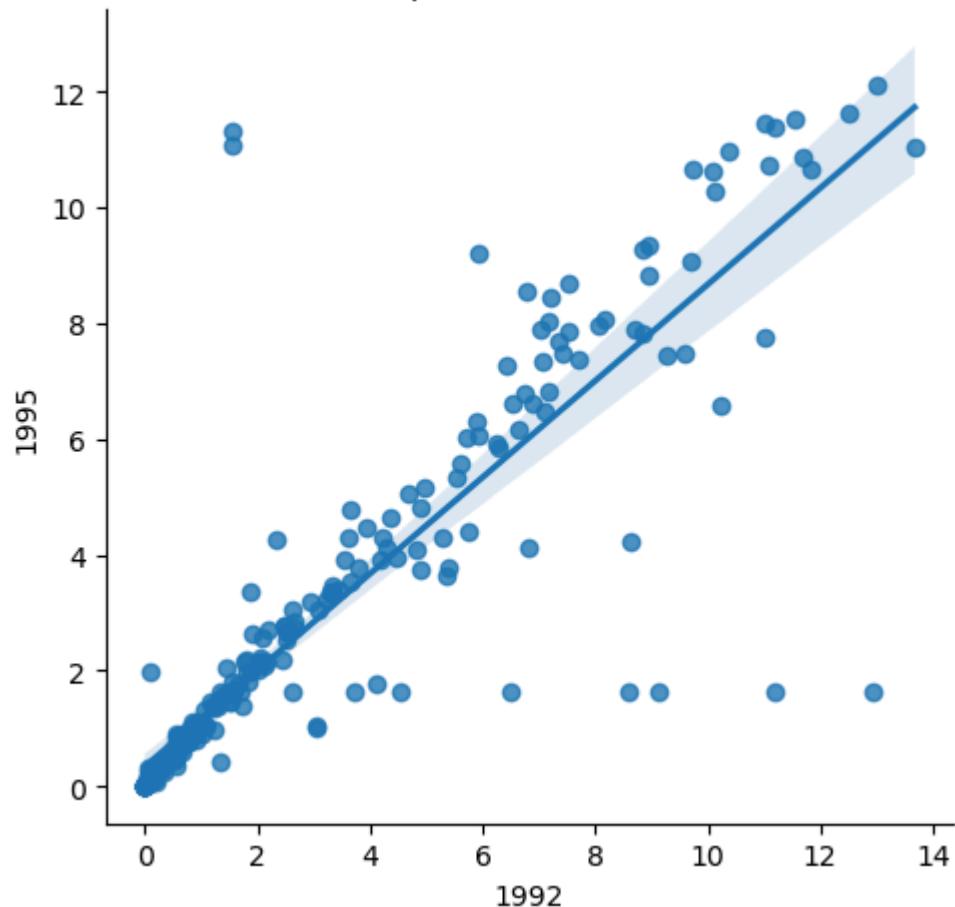
Corelation: Positively Corelated.

Scaterplot of 1992 vs 1994

Corelation between 1992 and 1994 : 0.8809322627548962

Corelation: Positively Corelated.

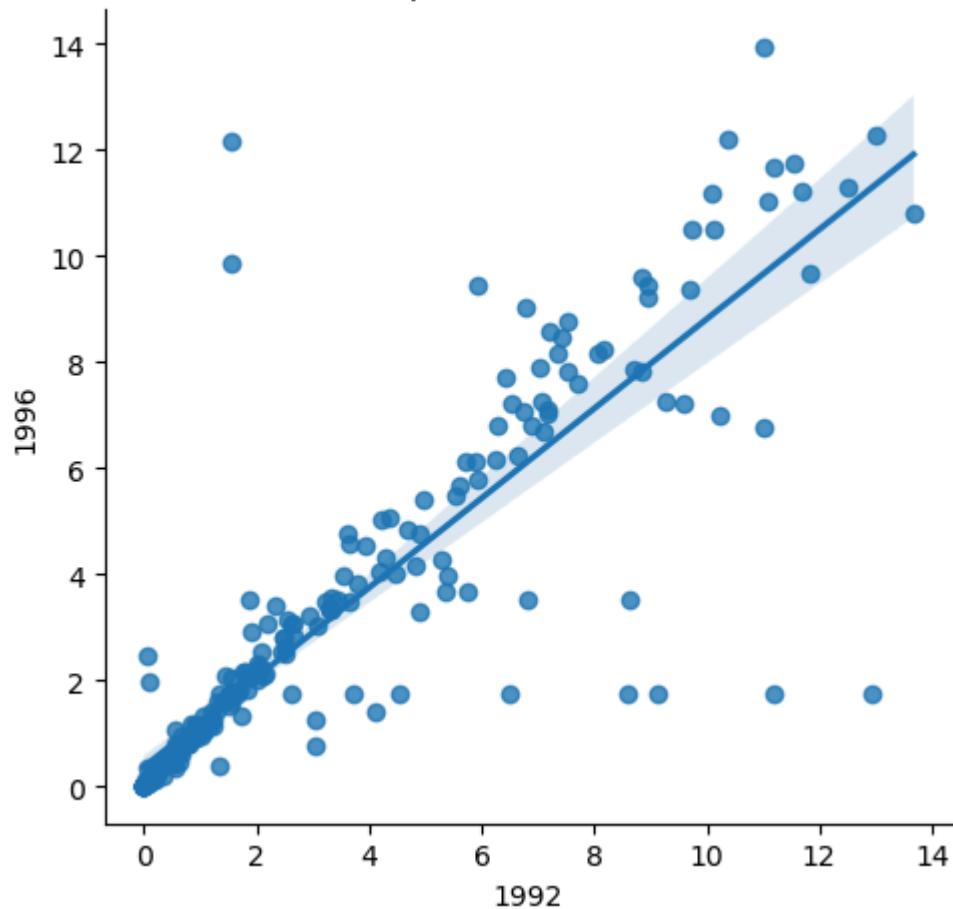
Scaterplot of 1992 vs 1995



Corelation between 1992 and 1995 : 0.8841558179634663

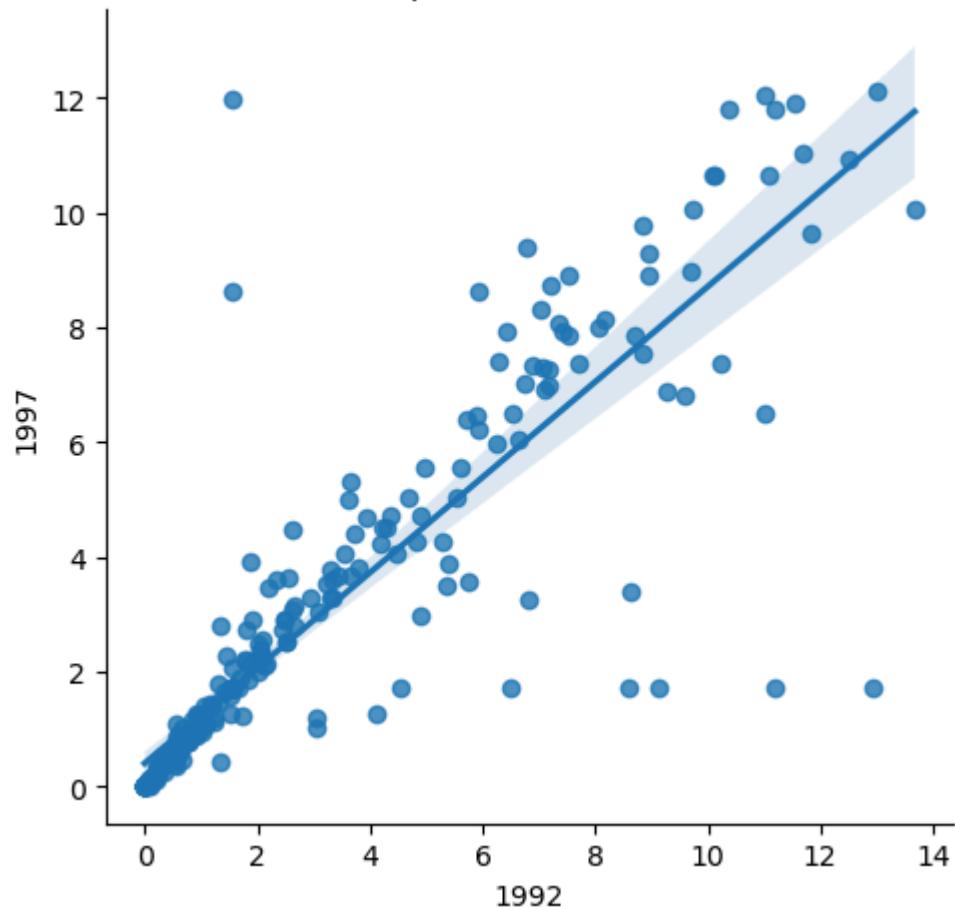
Corelation: Positively Corelated.

Scaterplot of 1992 vs 1996



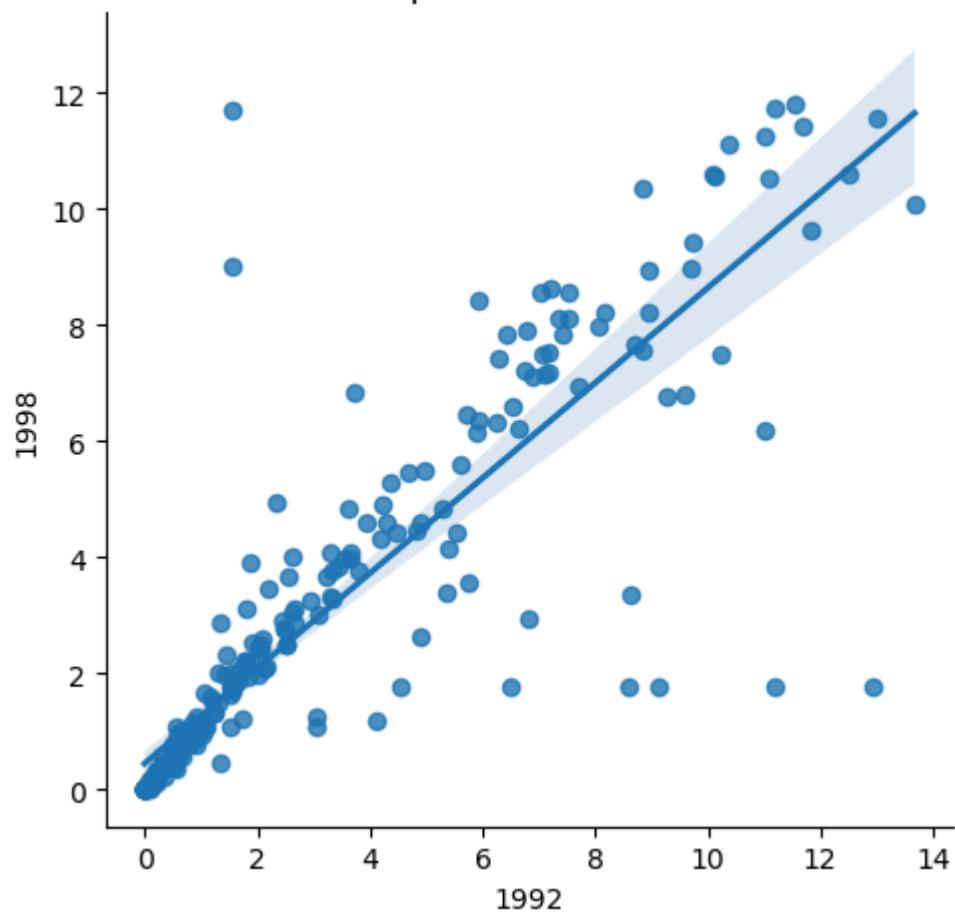
Corelation between 1992 and 1996 : 0.8784418857990619

Corelation: Positively Corelated.

Scaterplot of 1992 vs 1997

Corelation between 1992 and 1997 : 0.8792191552539598

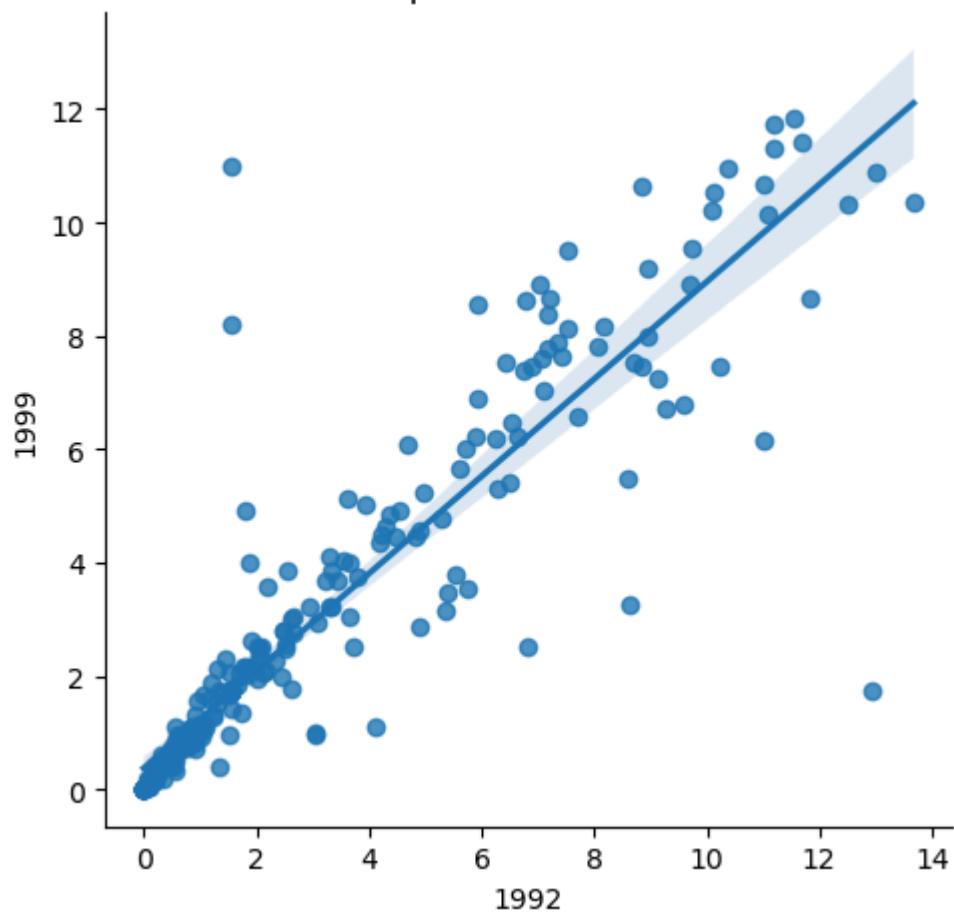
Corelation: Positively Corelated.

Scaterplot of 1992 vs 1998

Corelation between 1992 and 1998 : 0.8765476082456901

Corelation: Positively Corelated.

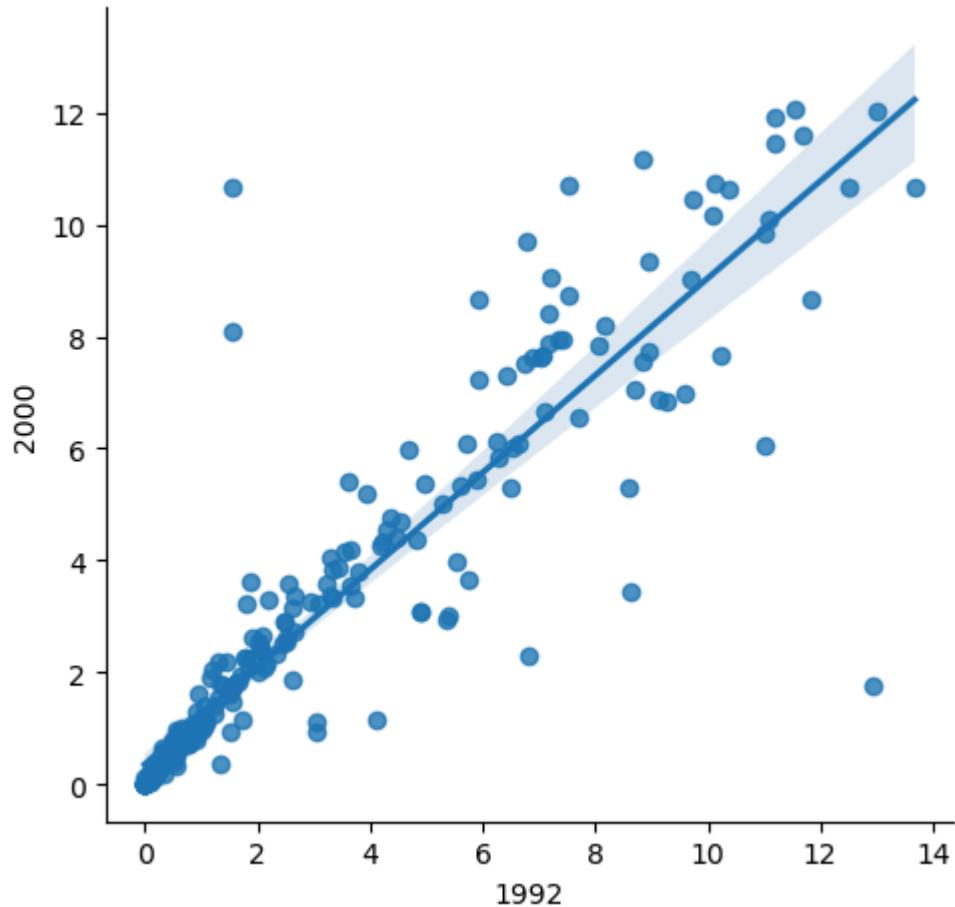
Scaterplot of 1992 vs 1999



Corelation between 1992 and 1999 : 0.9127159146455932

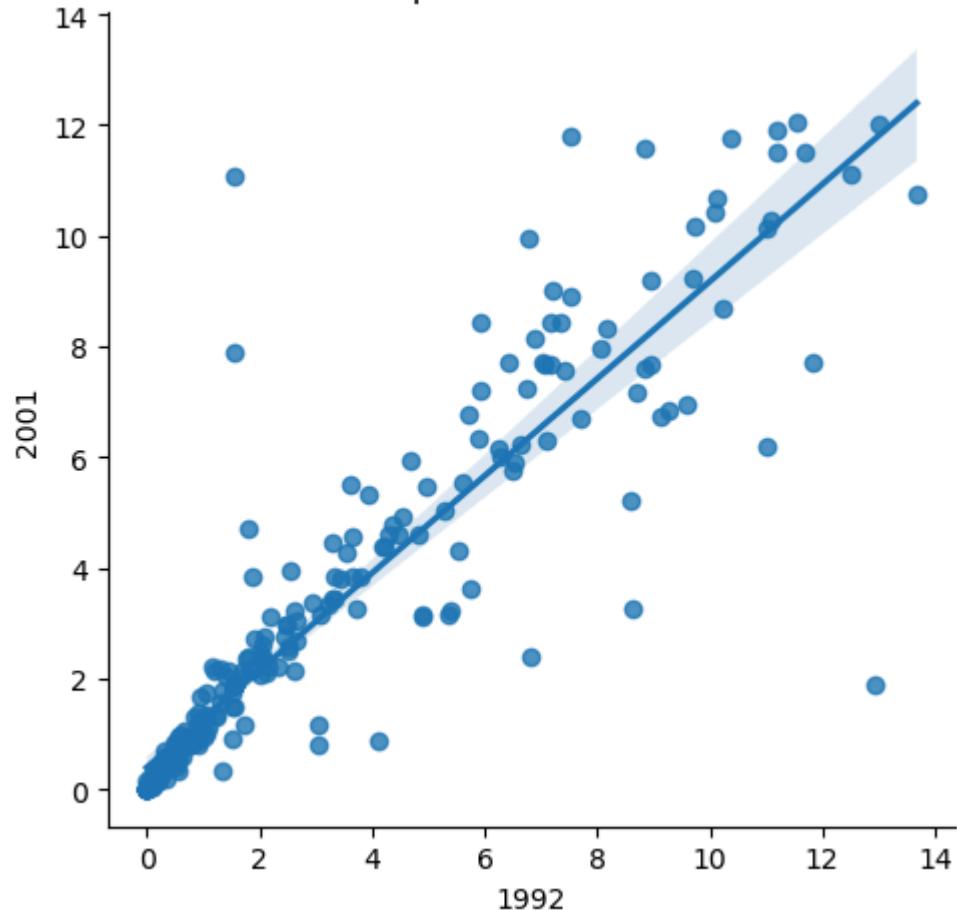
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2000



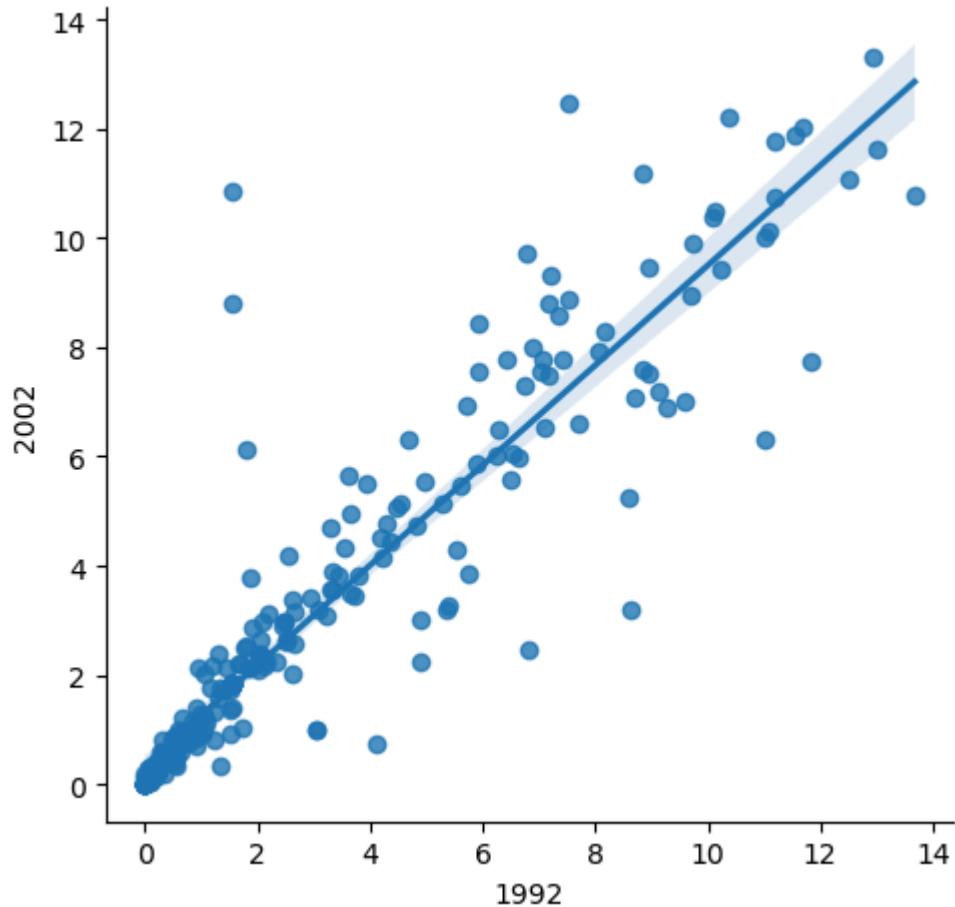
Corelation between 1992 and 2000 : 0.9133081390991532

Corelation: Positively Corelated.

Scaterplot of 1992 vs 2001

Corelation between 1992 and 2001 : 0.9090393308189795

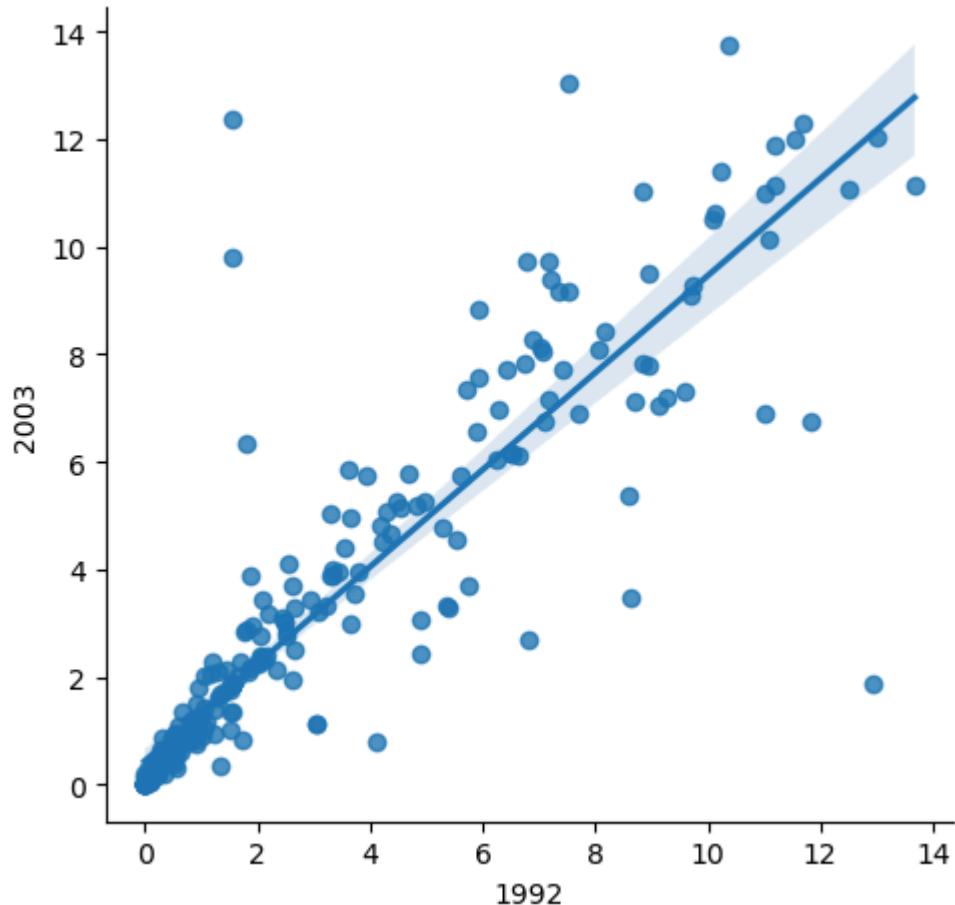
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2002

Corelation between 1992 and 2002 : 0.9256823935840621

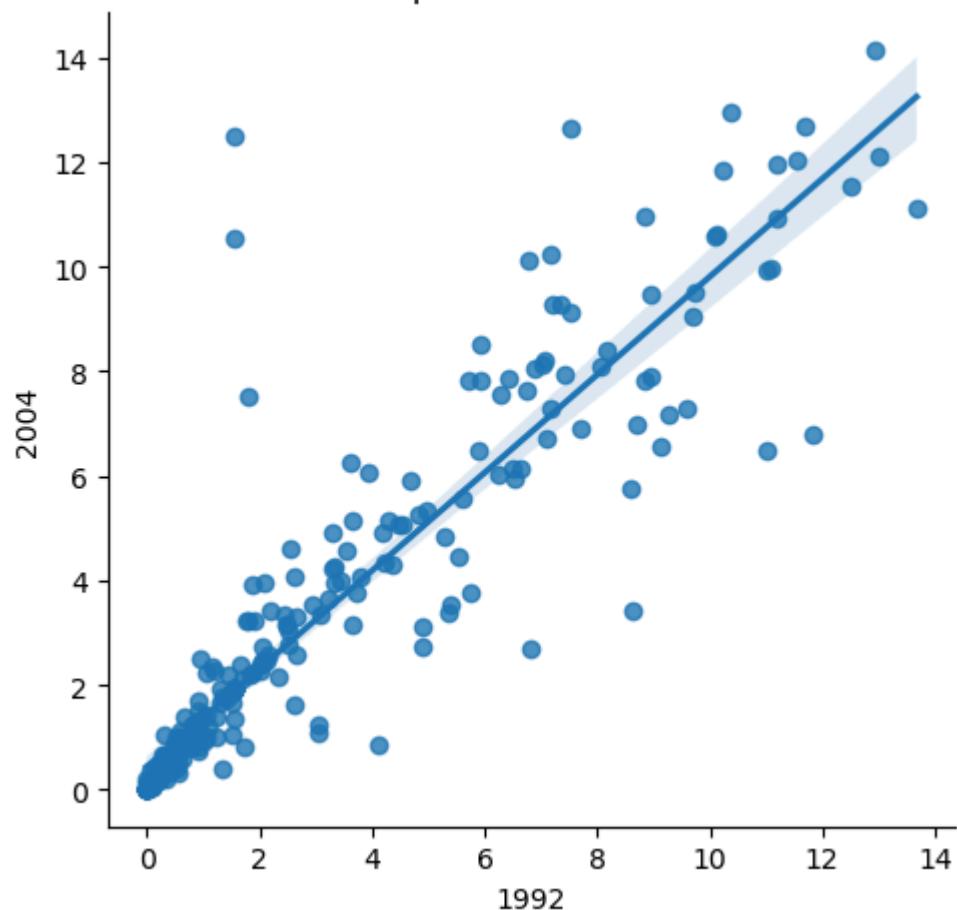
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2003



Corelation between 1992 and 2003 : 0.8961285395051338

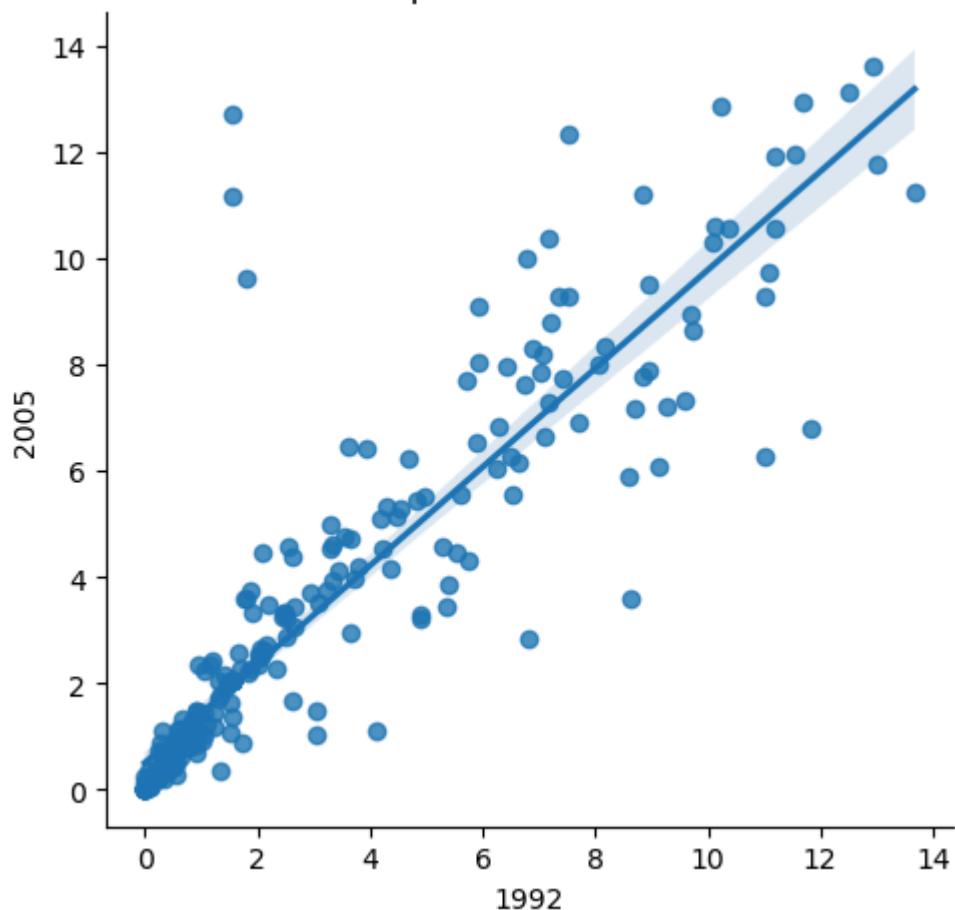
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2004

Corelation between 1992 and 2004 : 0.911945670586271

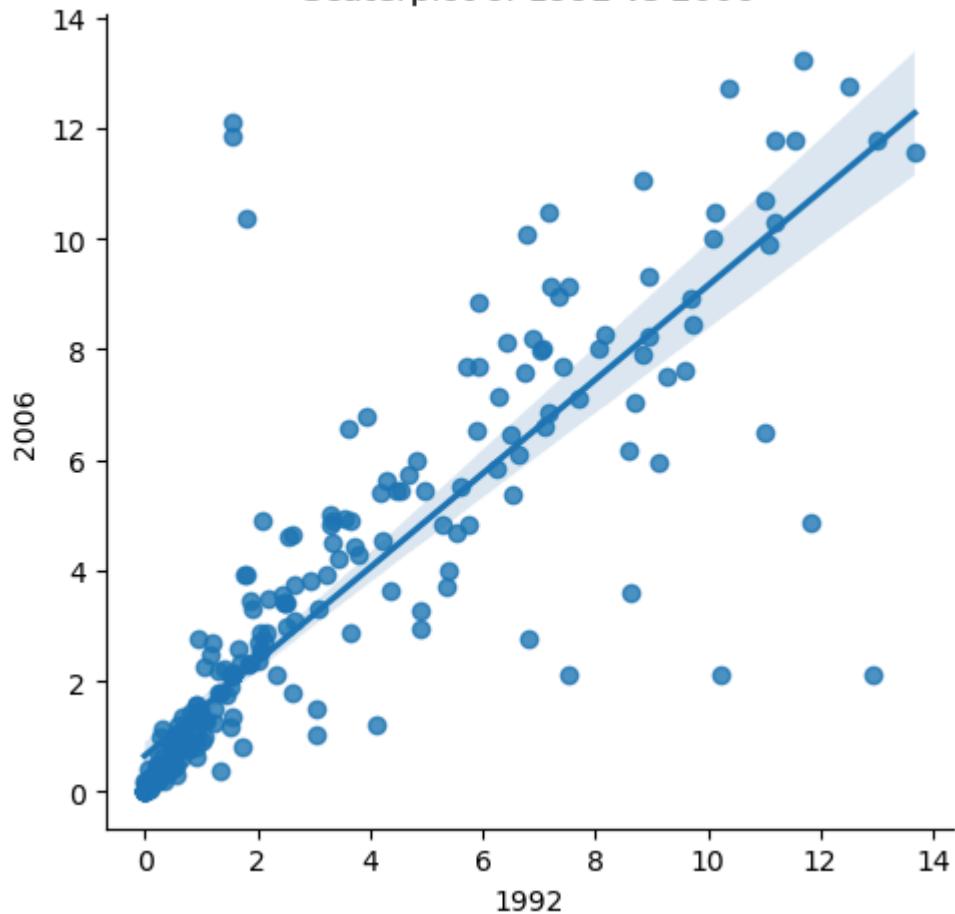
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2005



Corelation between 1992 and 2005 : 0.9039603612313314

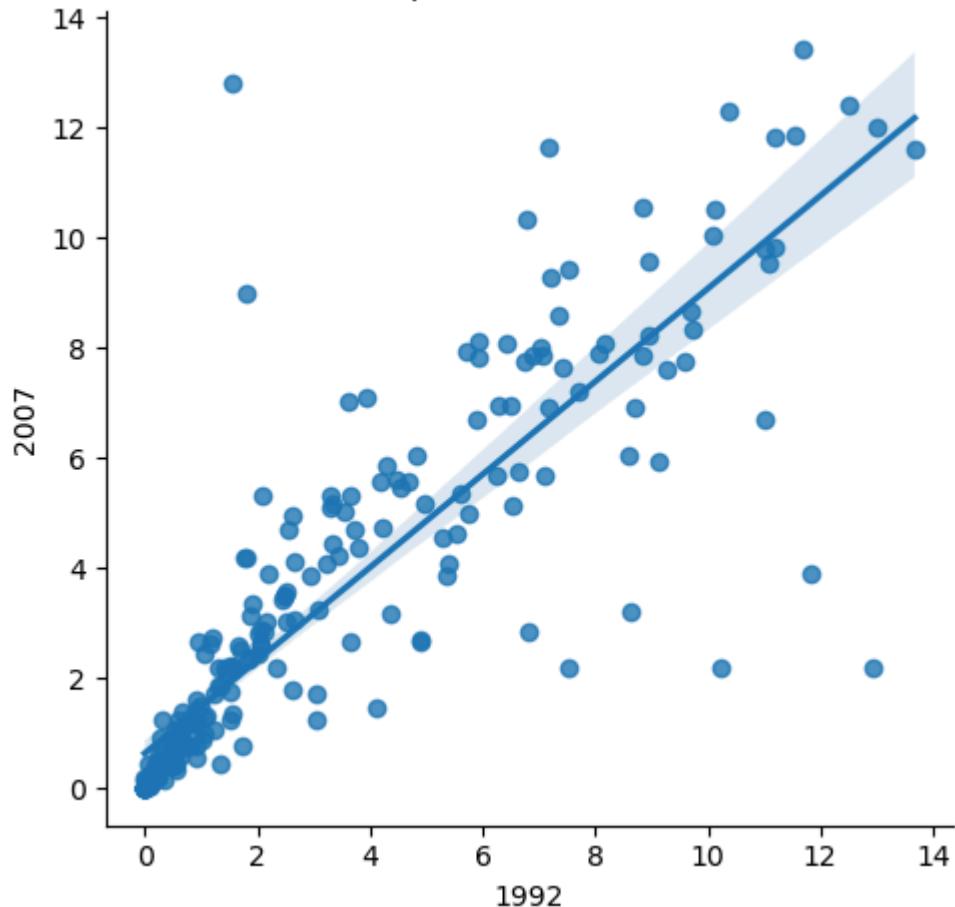
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2006

Corelation between 1992 and 2006 : 0.8600682572148471

Corelation: Positively Corelated.

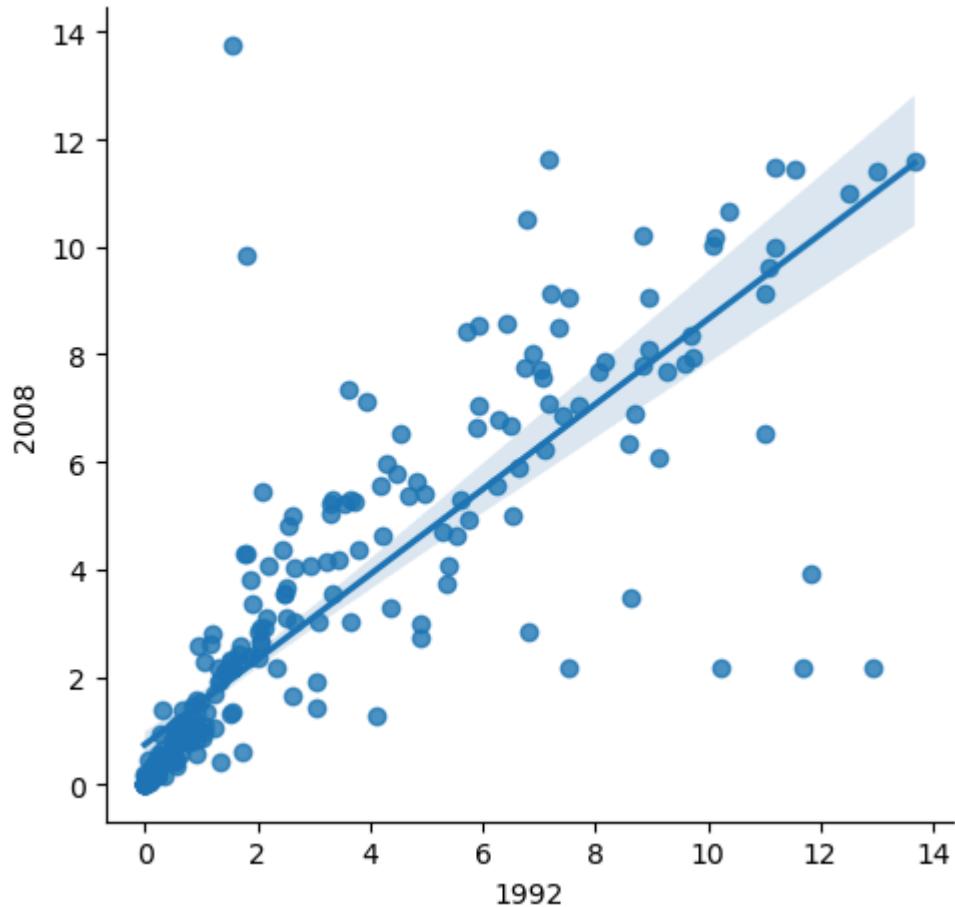
Scaterplot of 1992 vs 2007



Corelation between 1992 and 2007 : 0.8680719566181974

Corelation: Positively Corelated.

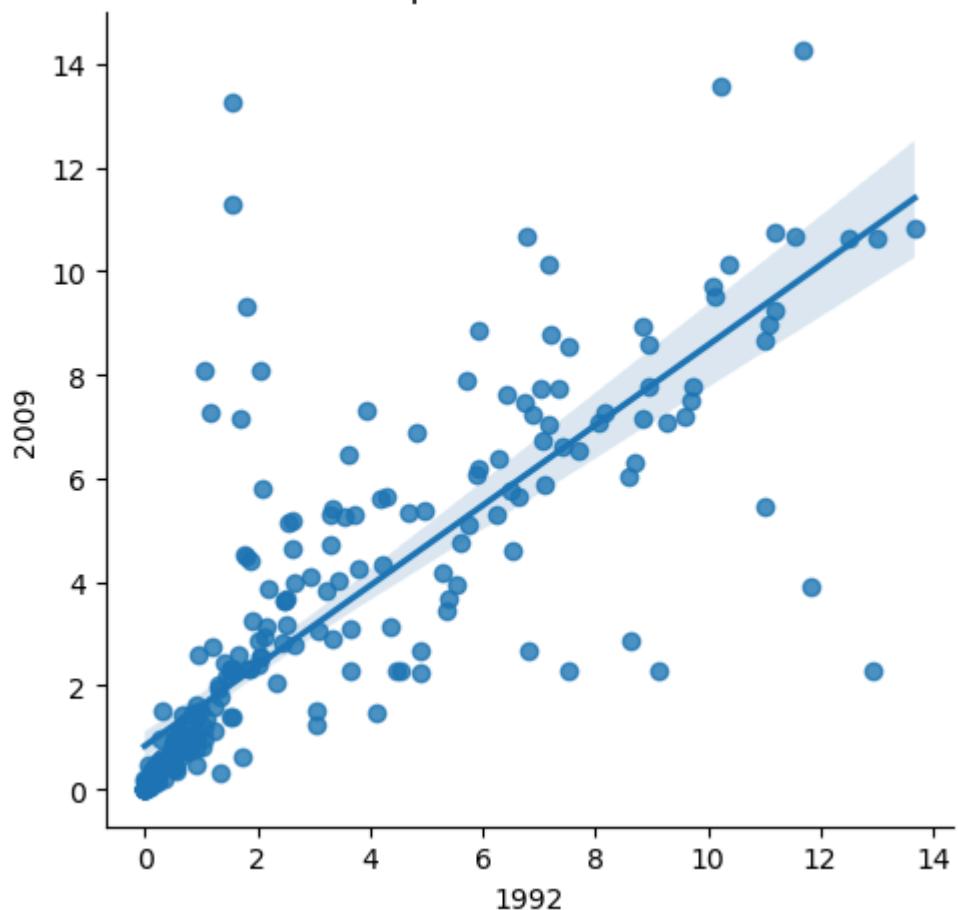
Scaterplot of 1992 vs 2008



Corelation between 1992 and 2008 : 0.8407587004353346

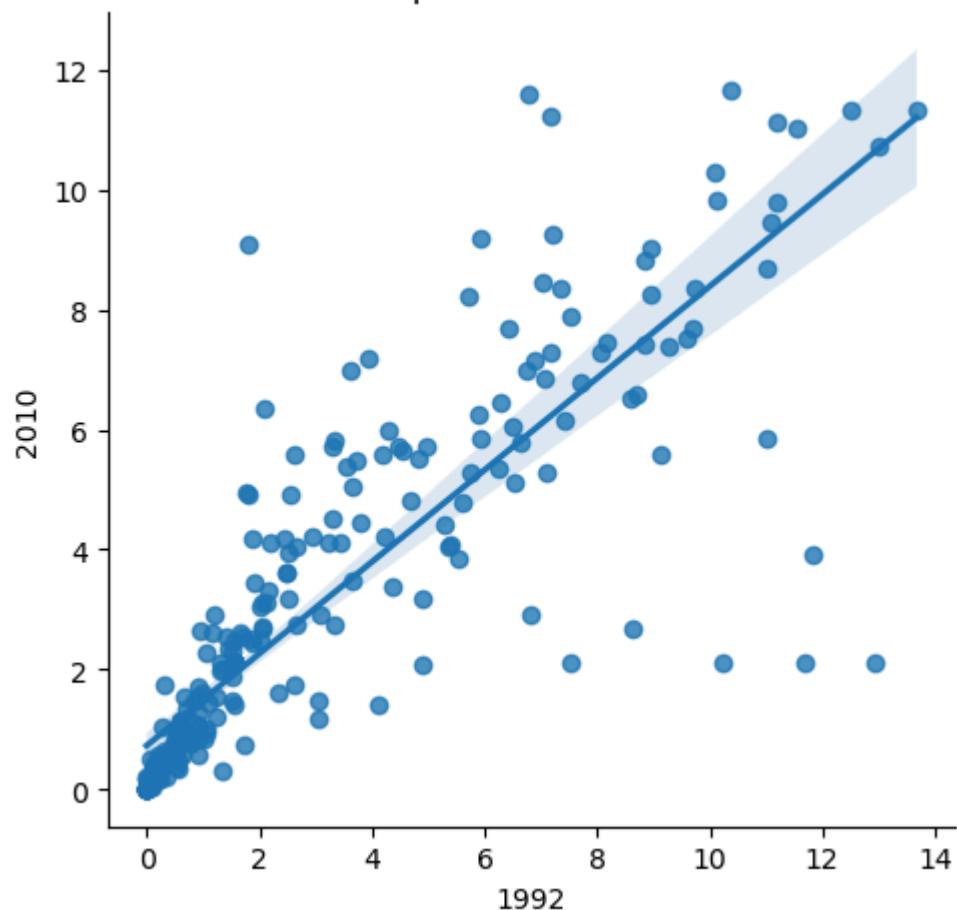
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2009



Corelation between 1992 and 2009 : 0.8125763763533377

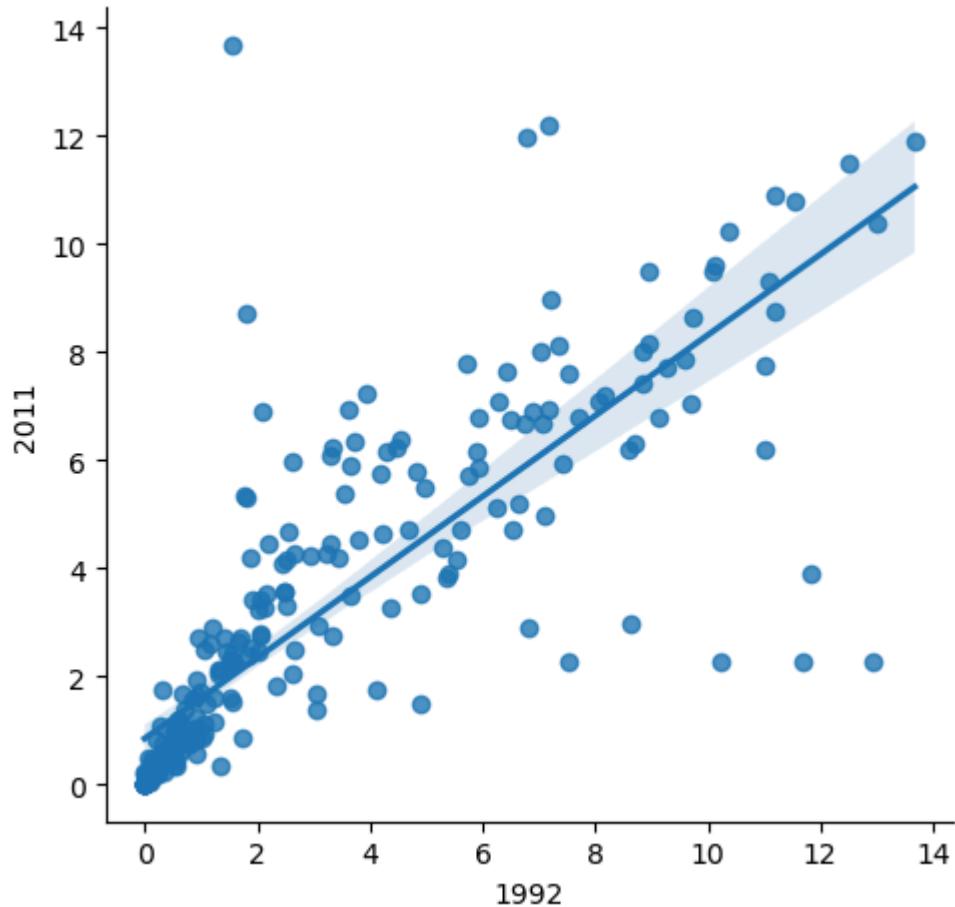
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2010

Corelation between 1992 and 2010 : 0.8529244584374118

Corelation: Positively Corelated.

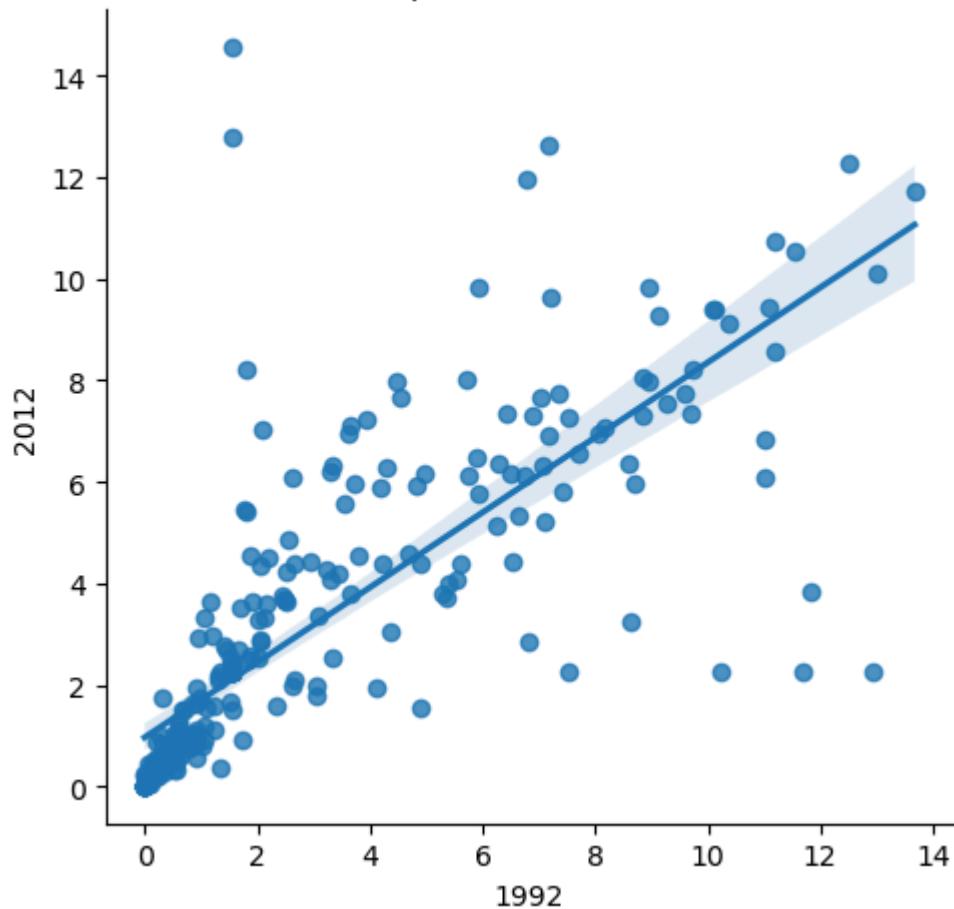
Scaterplot of 1992 vs 2011



Corelation between 1992 and 2011 : 0.822856274673965

Corelation: Positively Corelated.

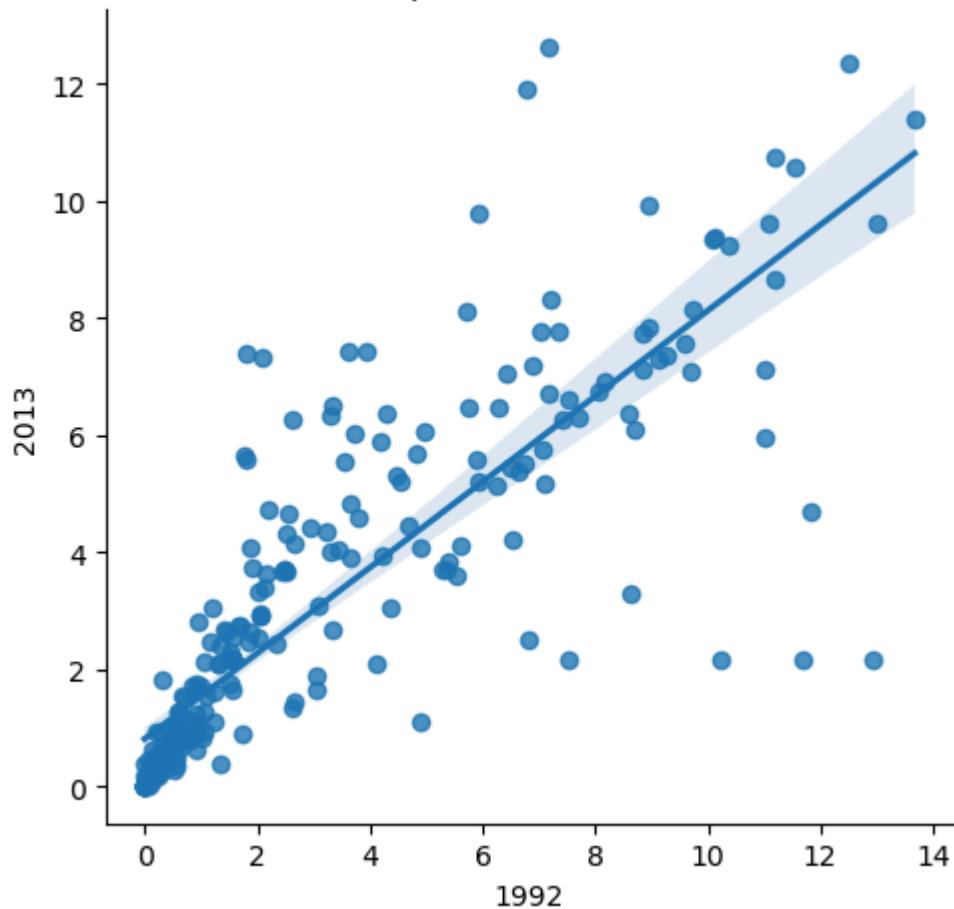
Scaterplot of 1992 vs 2012



Corelation between 1992 and 2012 : 0.7888231835842235

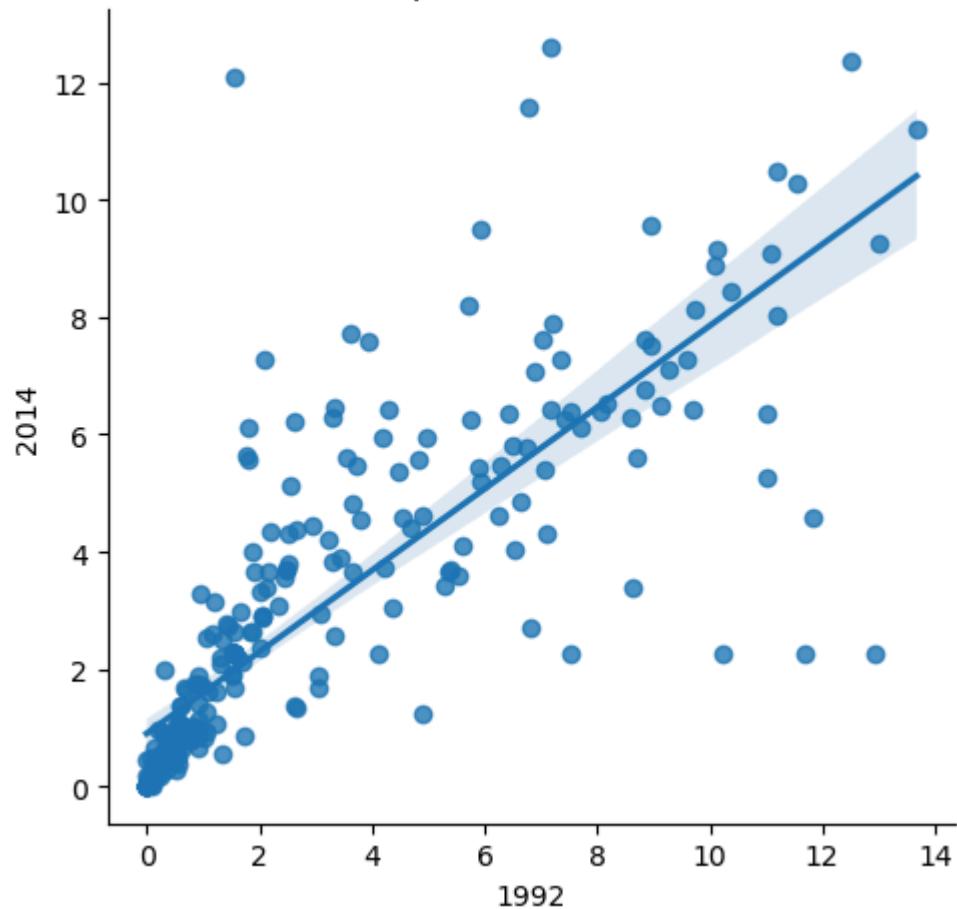
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2013



Corelation between 1992 and 2013 : 0.8396429712637489

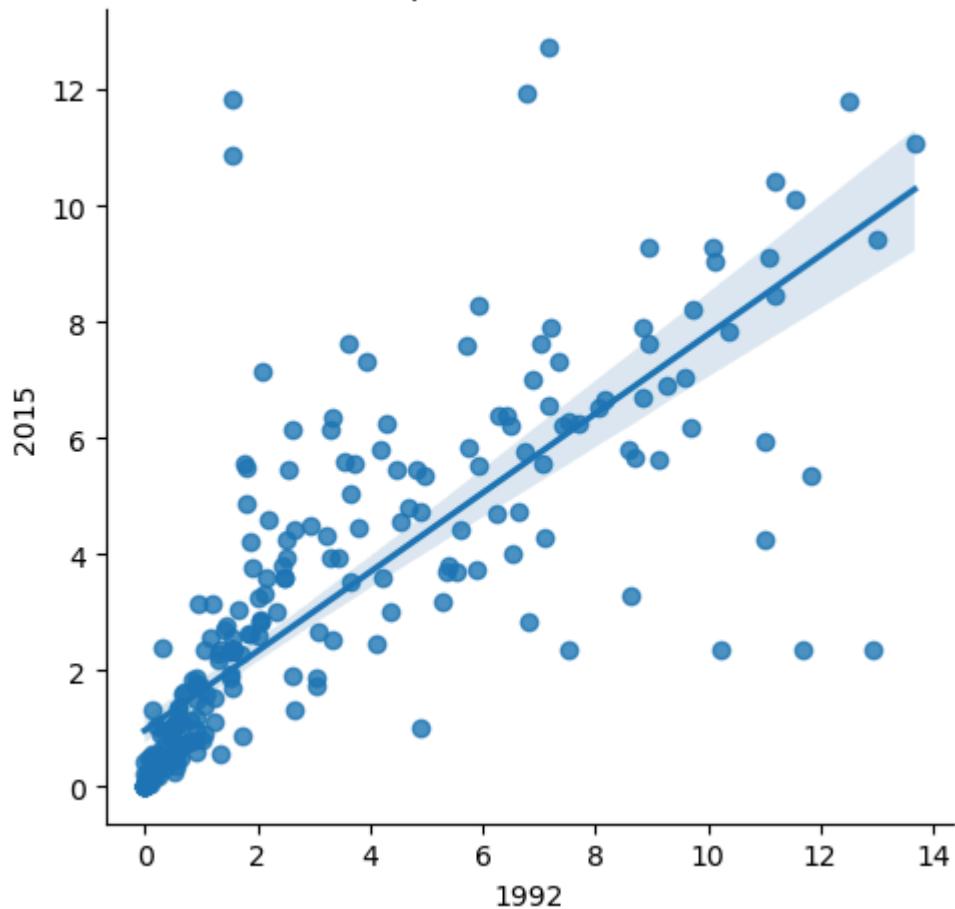
Corelation: Positively Corelated.

Scaterplot of 1992 vs 2014

Corelation between 1992 and 2014 : 0.8112523108378131

Corelation: Positively Corelated.

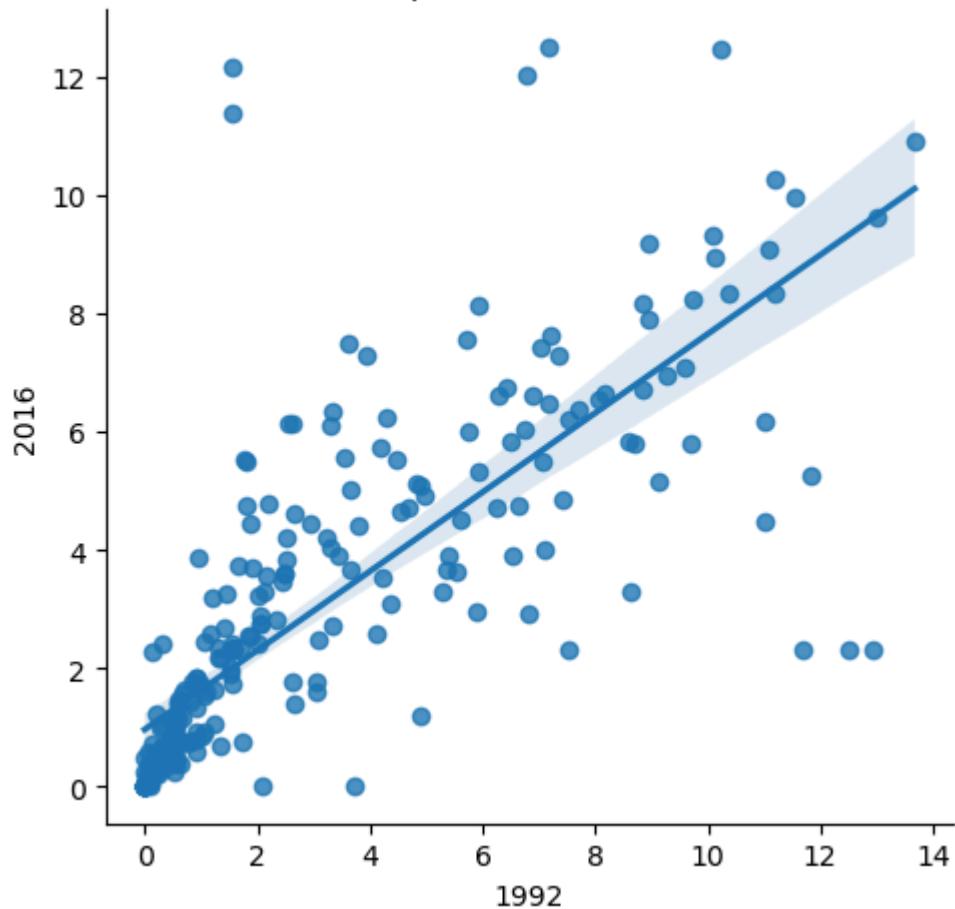
Scaterplot of 1992 vs 2015



Corelation between 1992 and 2015 : 0.796049140704453

Corelation: Positively Corelated.

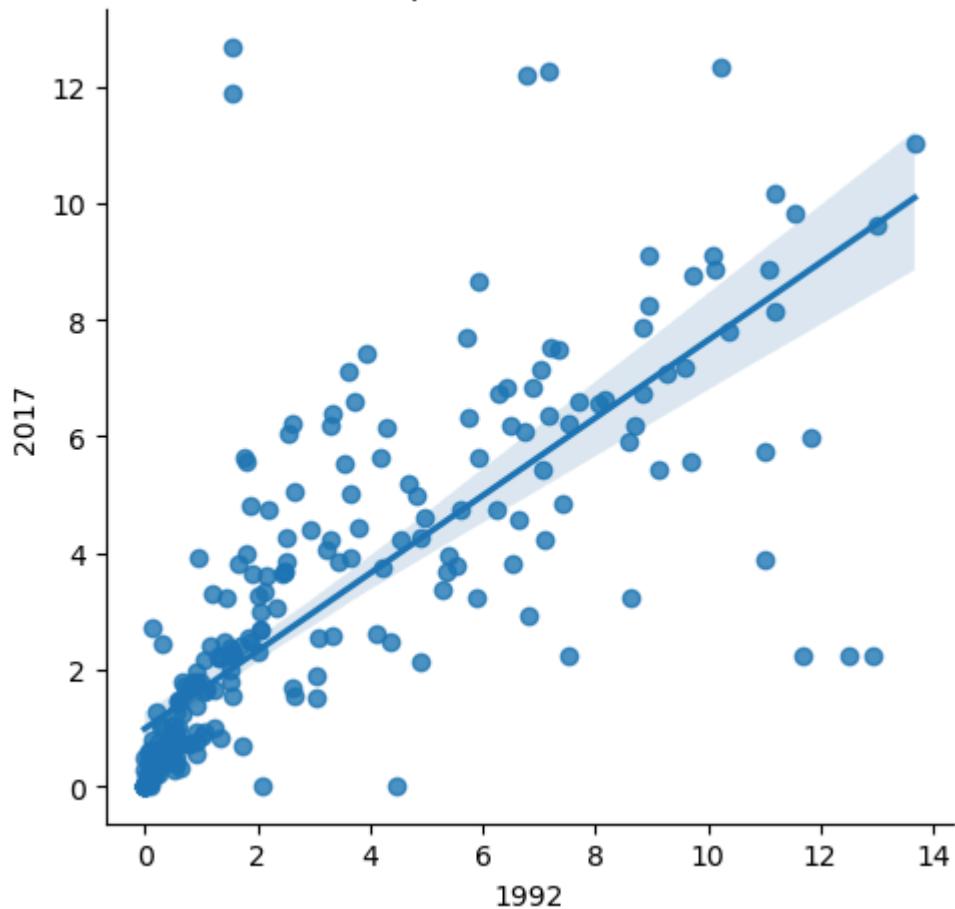
Scaterplot of 1992 vs 2016



Corelation between 1992 and 2016 : 0.7822932307549624

Corelation: Positively Corelated.

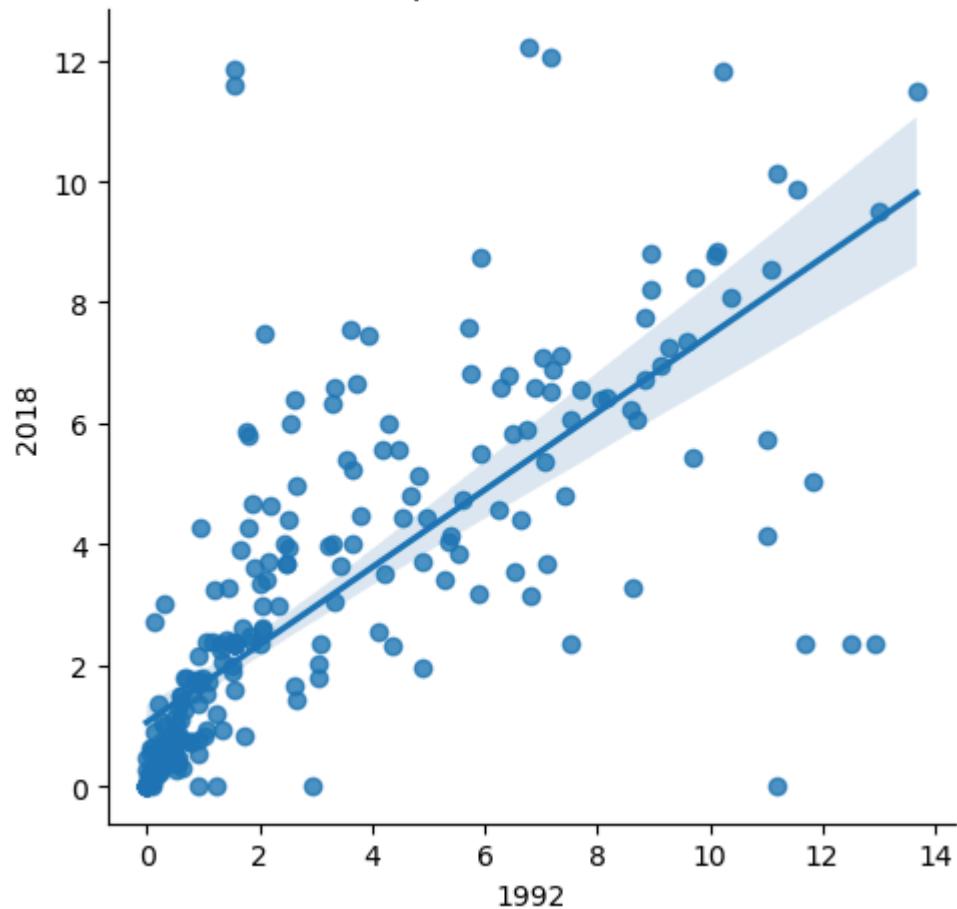
Scaterplot of 1992 vs 2017



Corelation between 1992 and 2017 : 0.7746532146697171

Corelation: Positively Corelated.

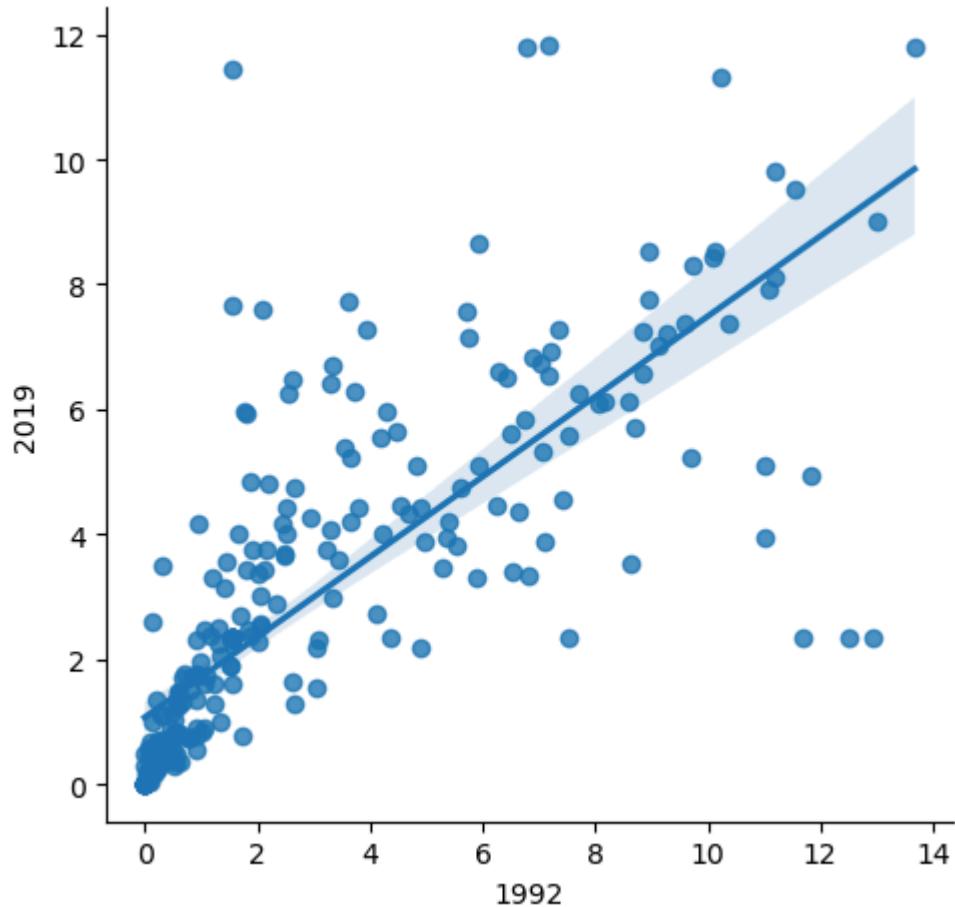
Scaterplot of 1992 vs 2018



Corelation between 1992 and 2018 : 0.7508547502925488

Corelation: Positively Corelated.

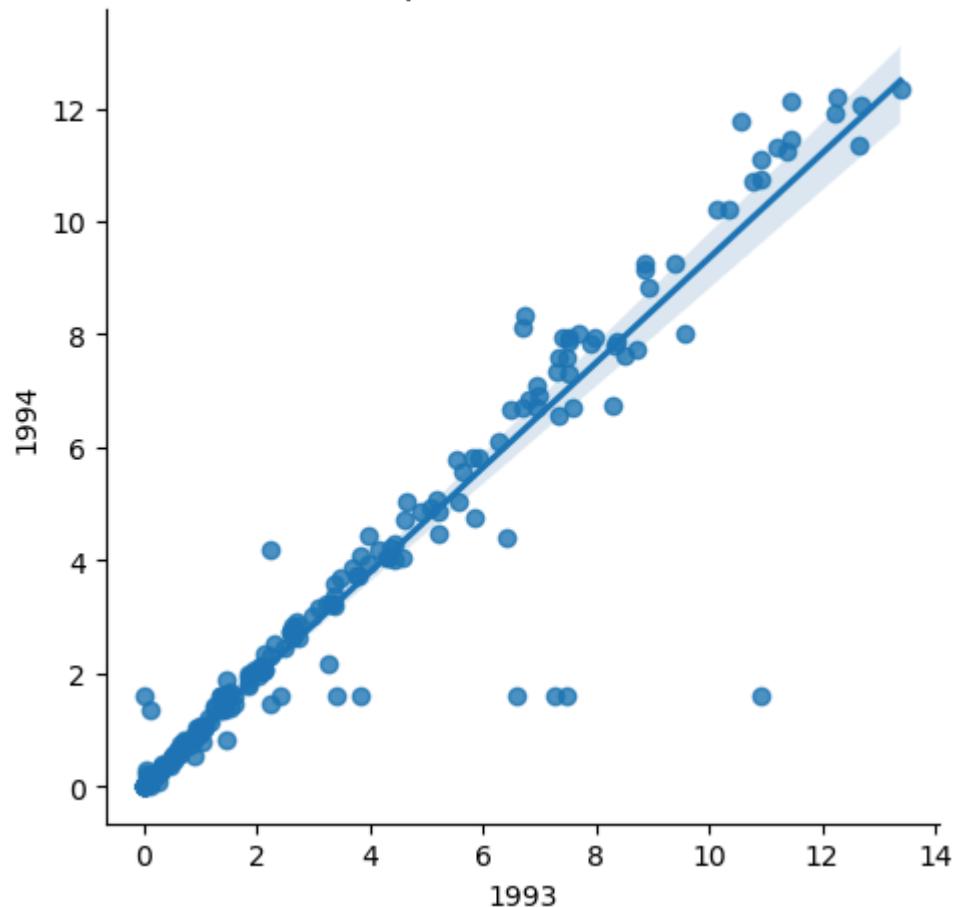
Scaterplot of 1992 vs 2019



Corelation between 1992 and 2019 : 0.7793705023941431

Corelation: Positively Corelated.

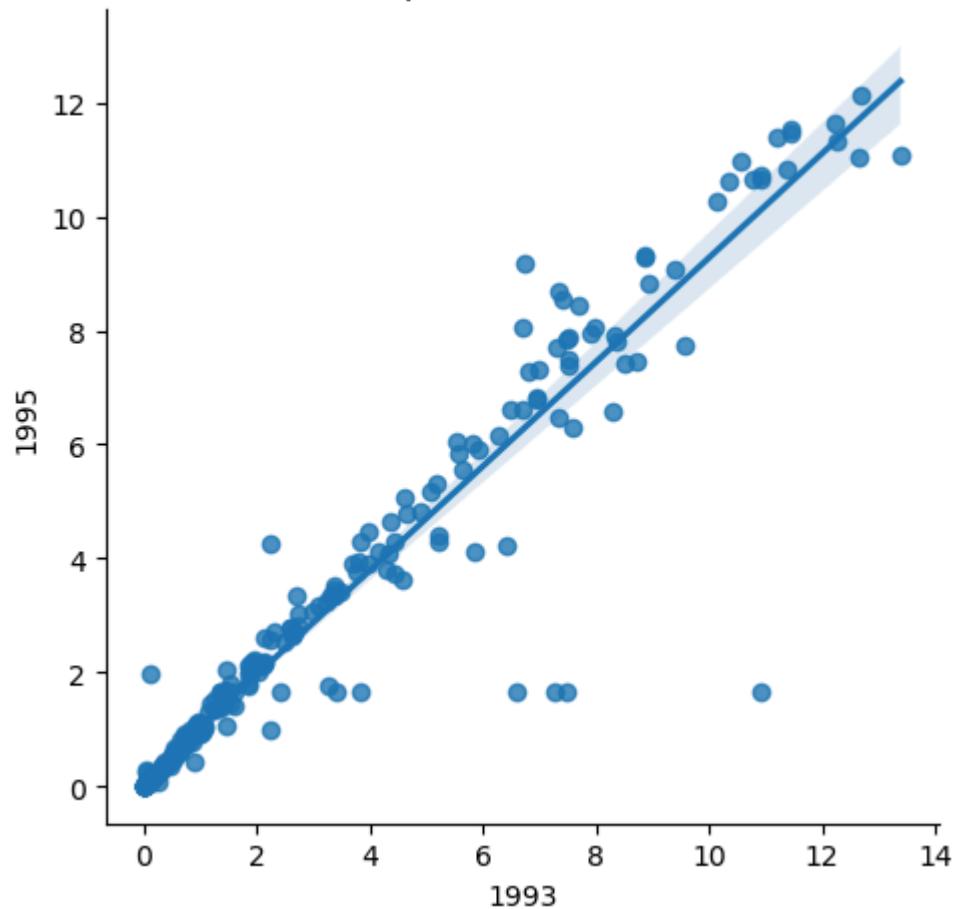
Scaterplot of 1993 vs 1994



Corelation between 1993 and 1994 : 0.9620337241618625

Corelation: Positively Corelated.

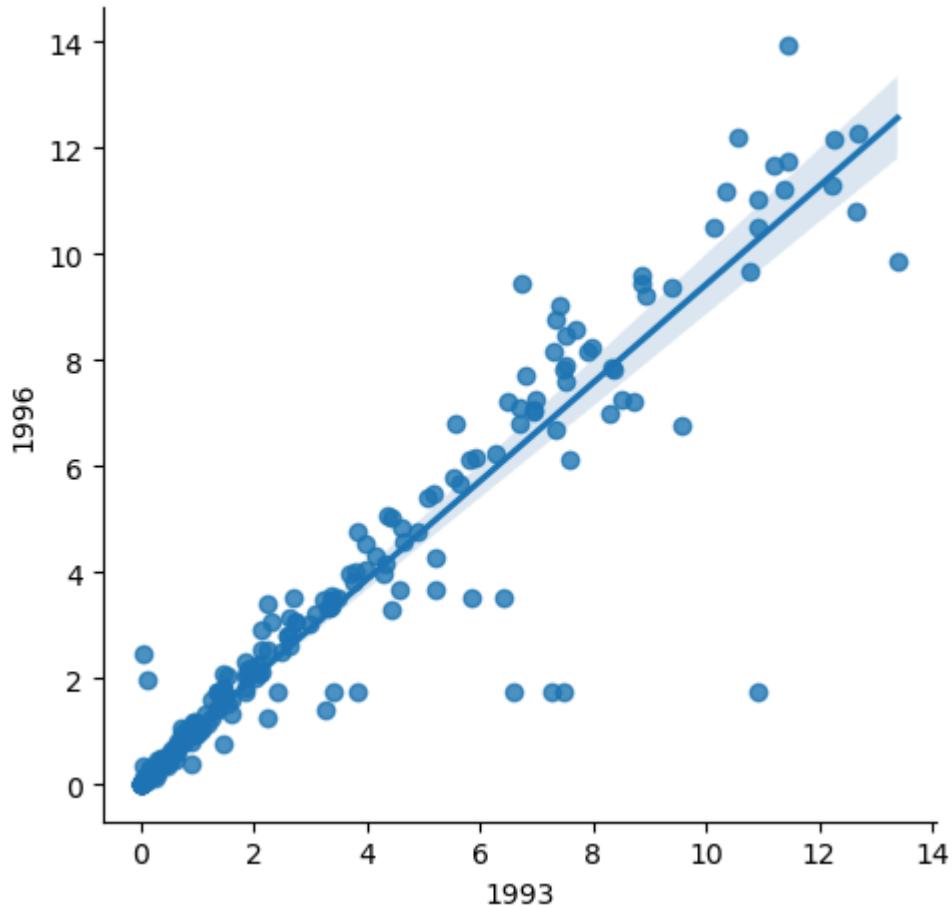
Scaterplot of 1993 vs 1995



Corelation between 1993 and 1995 : 0.9581839745726898

Corelation: Positively Corelated.

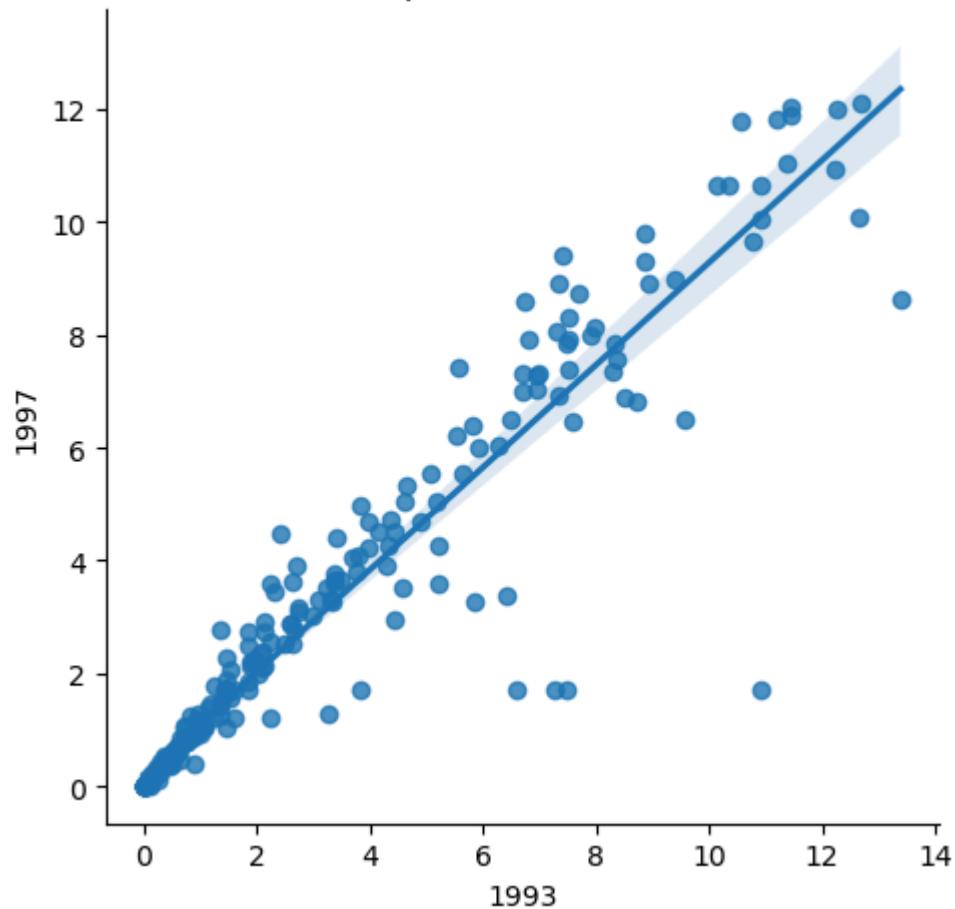
Scaterplot of 1993 vs 1996



Corelation between 1993 and 1996 : 0.9510347346181415

Corelation: Positively Corelated.

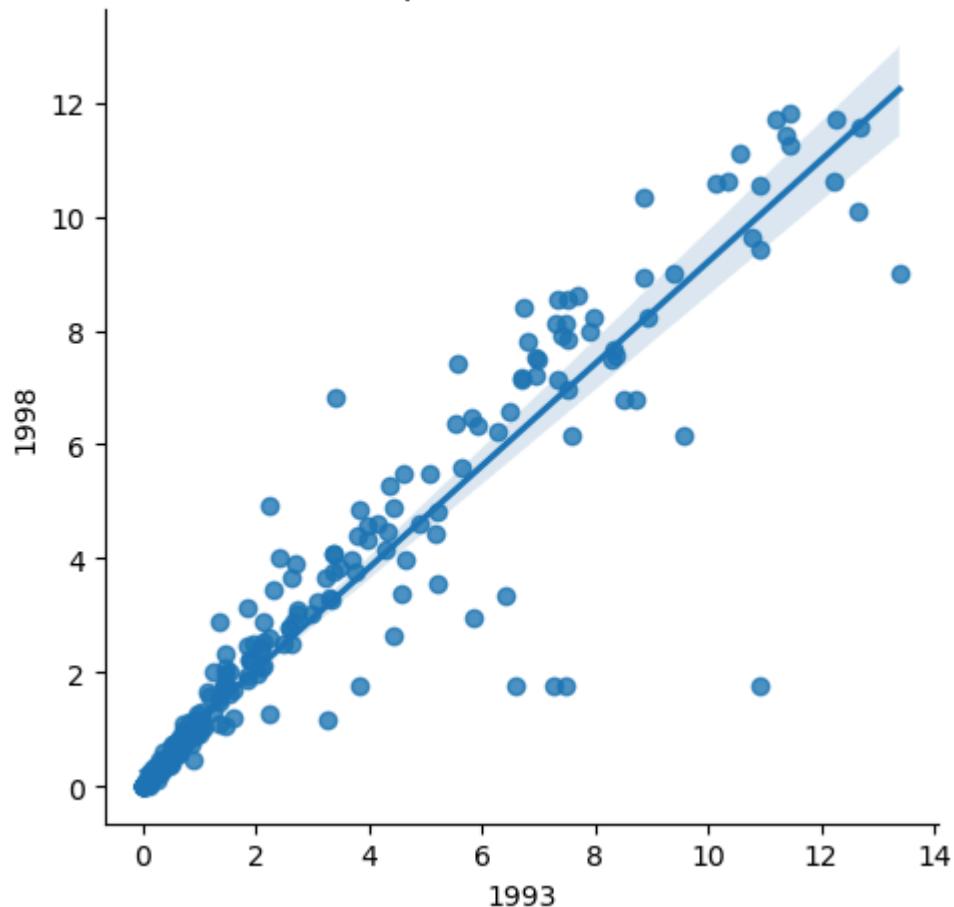
Scaterplot of 1993 vs 1997



Corelation between 1993 and 1997 : 0.9475336433109771

Corelation: Positively Corelated.

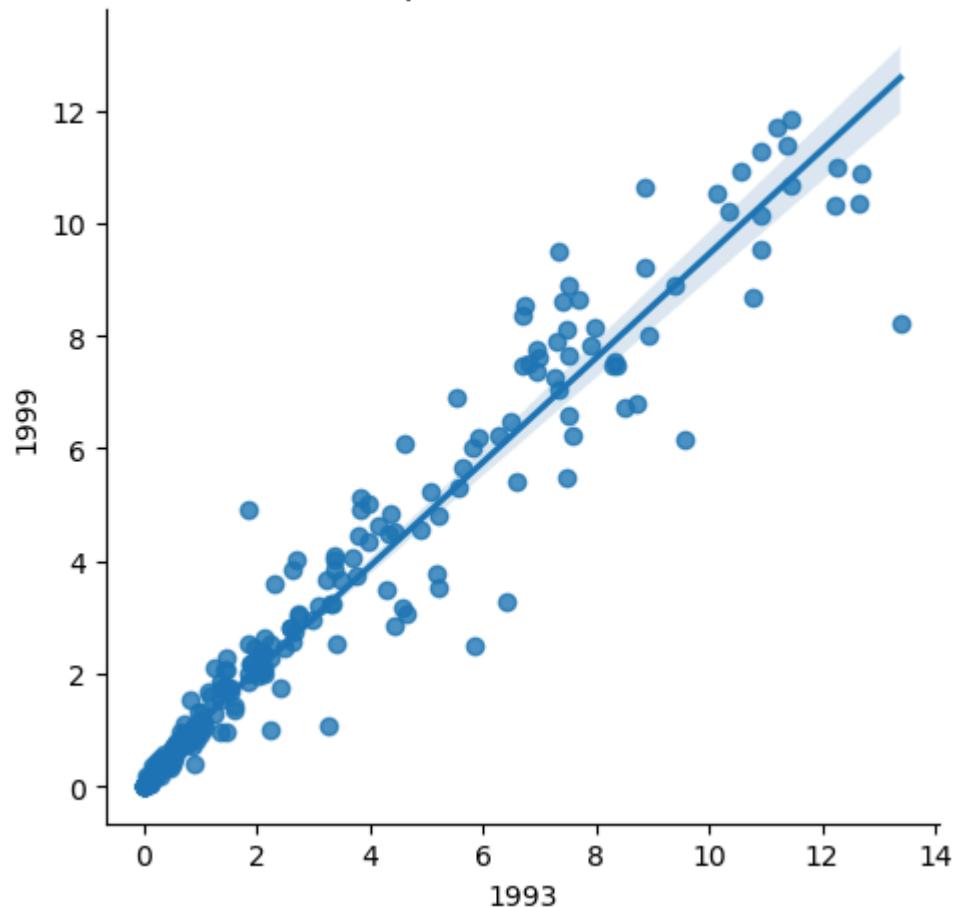
Scaterplot of 1993 vs 1998



Corelation between 1993 and 1998 : 0.9440802933486371

Corelation: Positively Corelated.

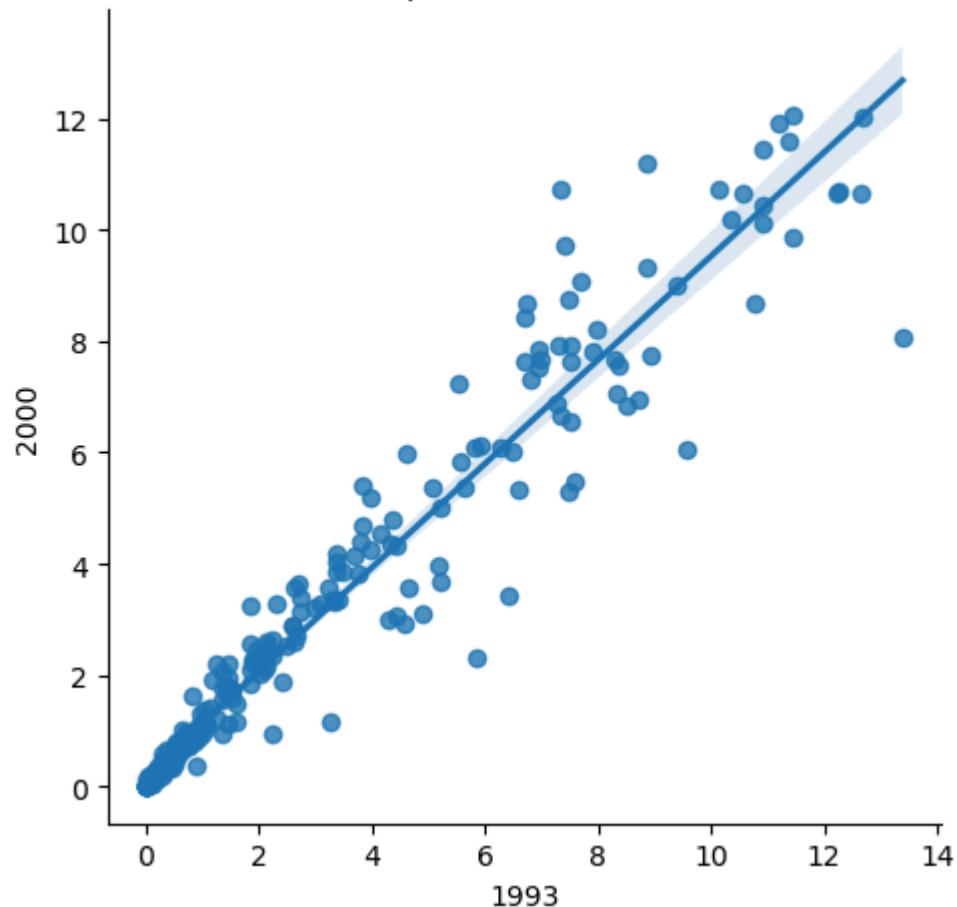
Scaterplot of 1993 vs 1999



Corelation between 1993 and 1999 : 0.9701926421771028

Corelation: Positively Corelated.

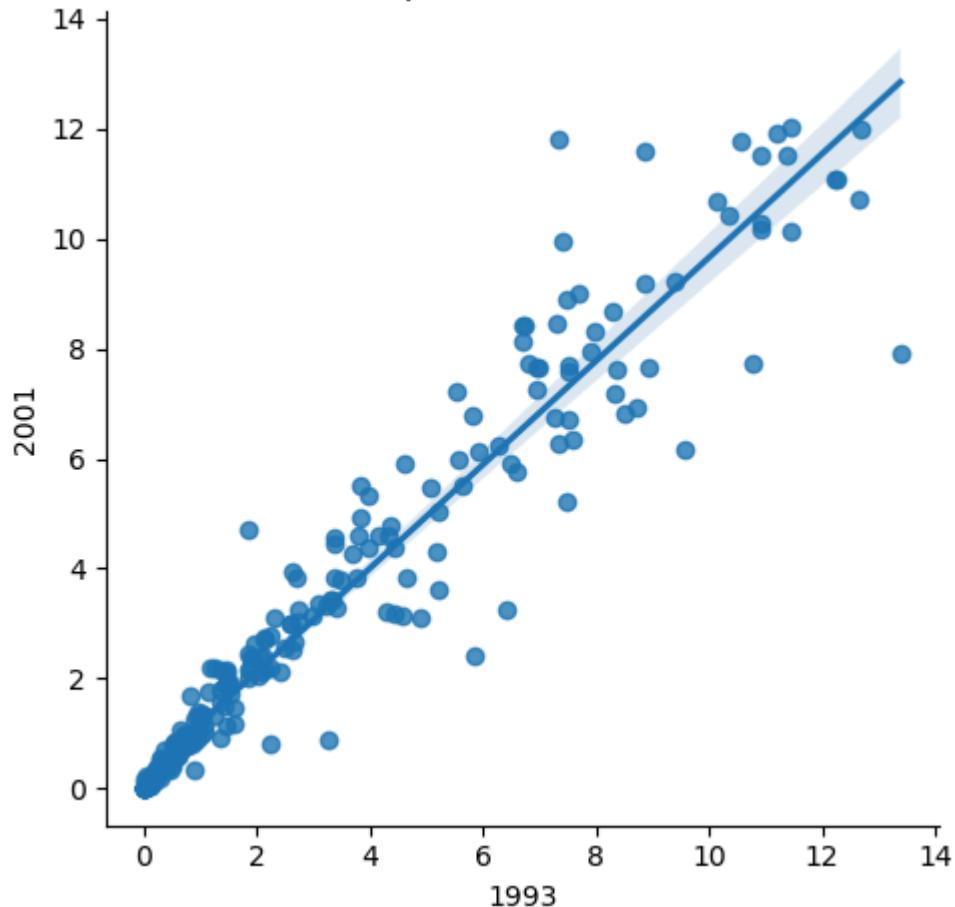
Scaterplot of 1993 vs 2000



Corelation between 1993 and 2000 : 0.9679567524500965

Corelation: Positively Corelated.

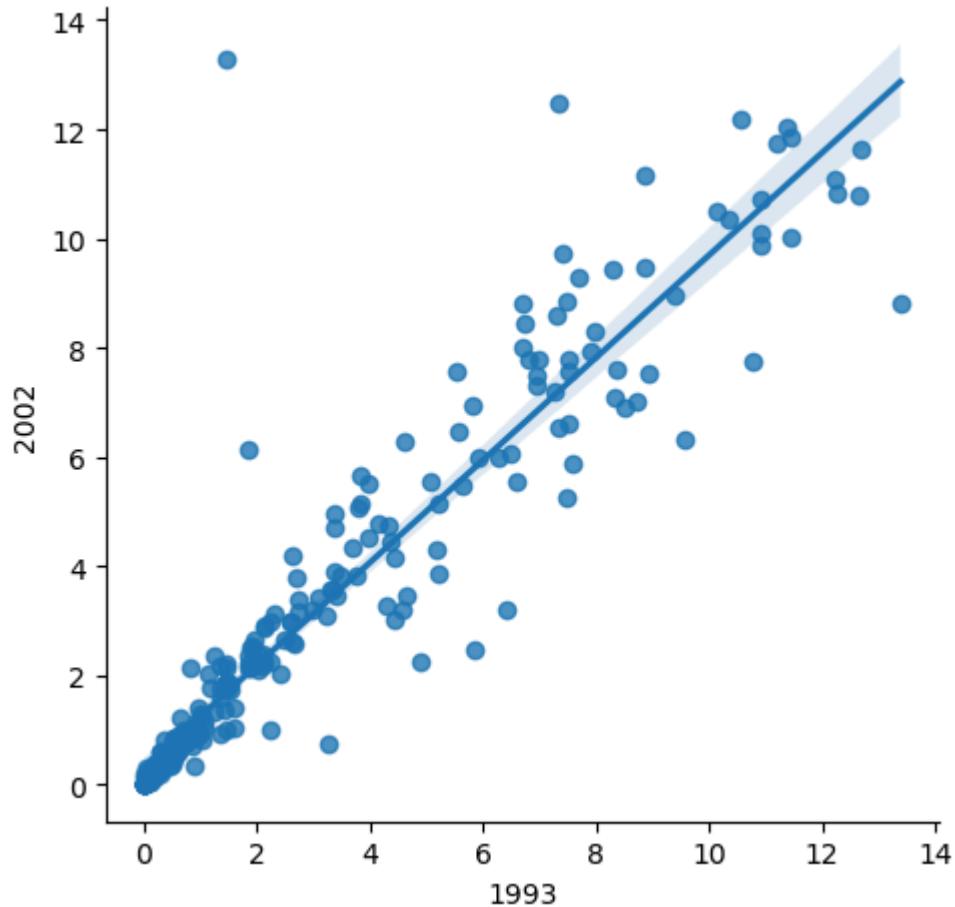
Scaterplot of 1993 vs 2001



Corelation between 1993 and 2001 : 0.9634523598586114

Corelation: Positively Corelated.

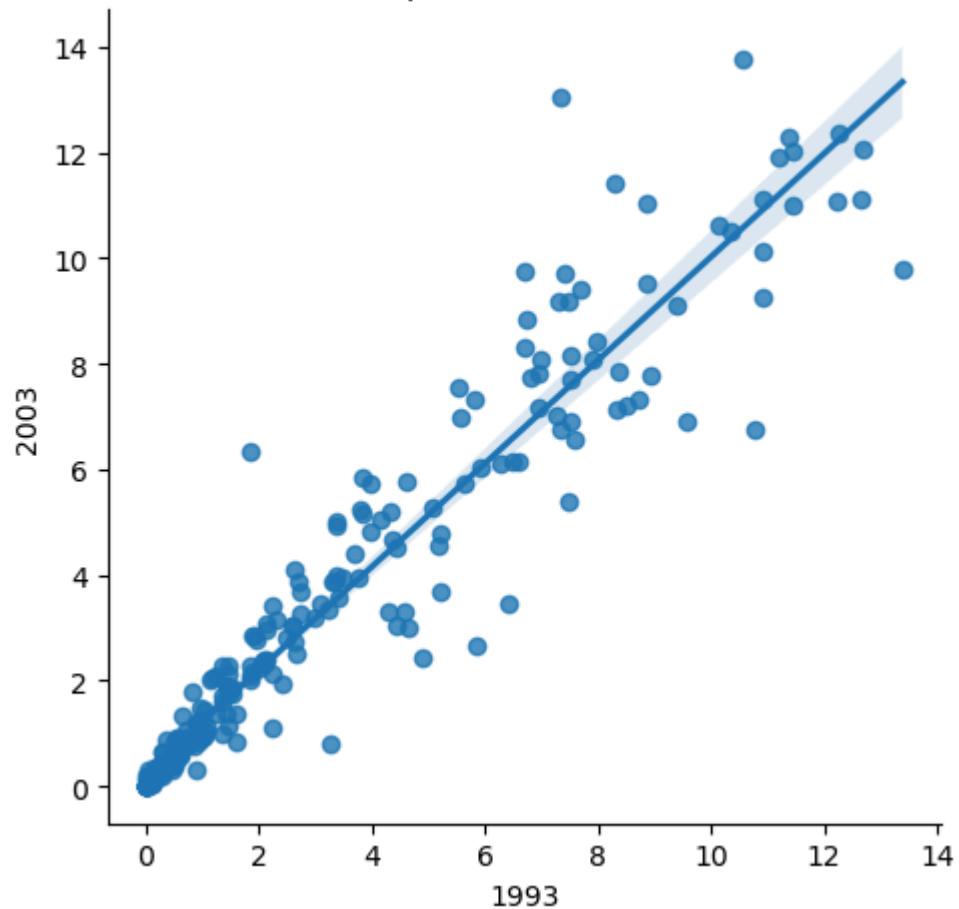
Scaterplot of 1993 vs 2002



Corelation between 1993 and 2002 : 0.9367304816241284

Corelation: Positively Corelated.

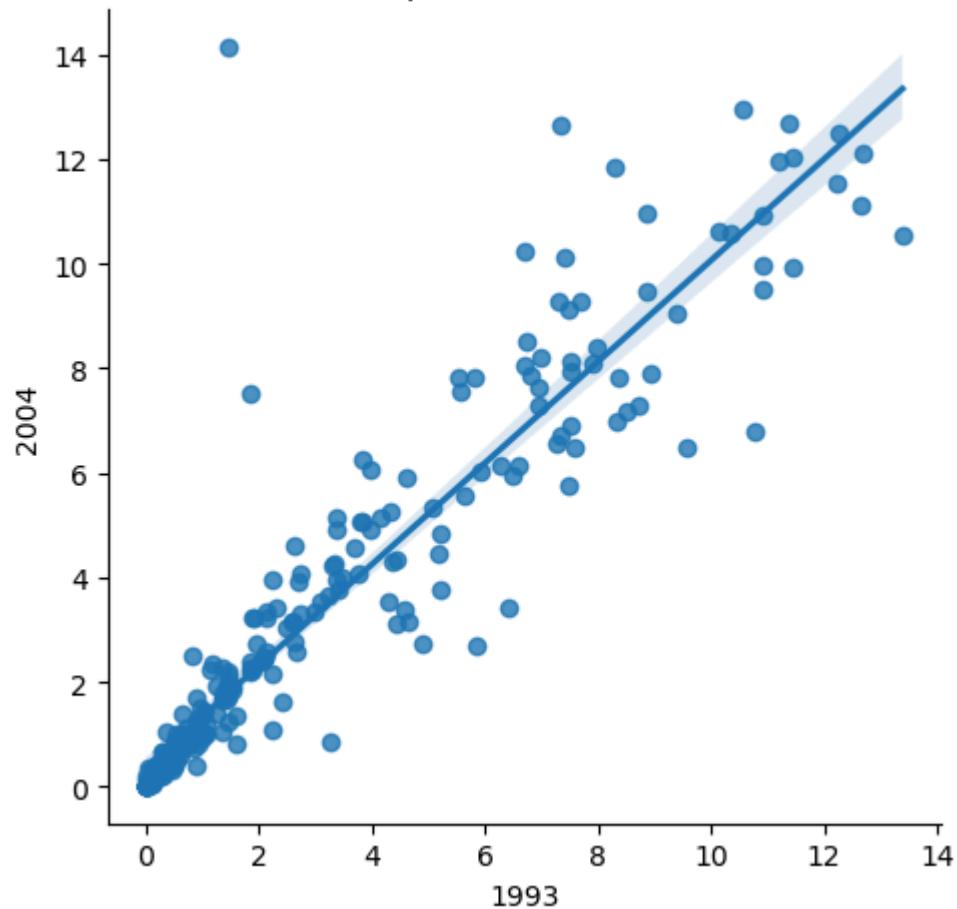
Scaterplot of 1993 vs 2003



Corelation between 1993 and 2003 : 0.9575648578942842

Corelation: Positively Corelated.

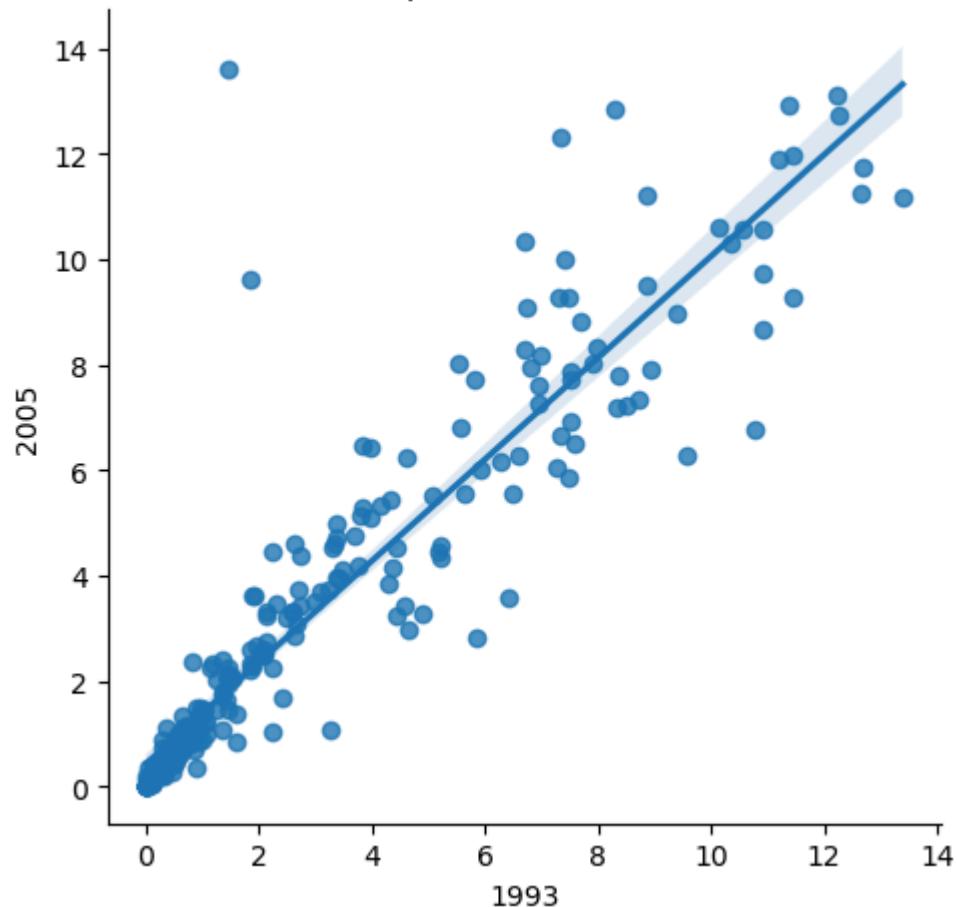
Scaterplot of 1993 vs 2004



Corelation between 1993 and 2004 : 0.9303266437821974

Corelation: Positively Corelated.

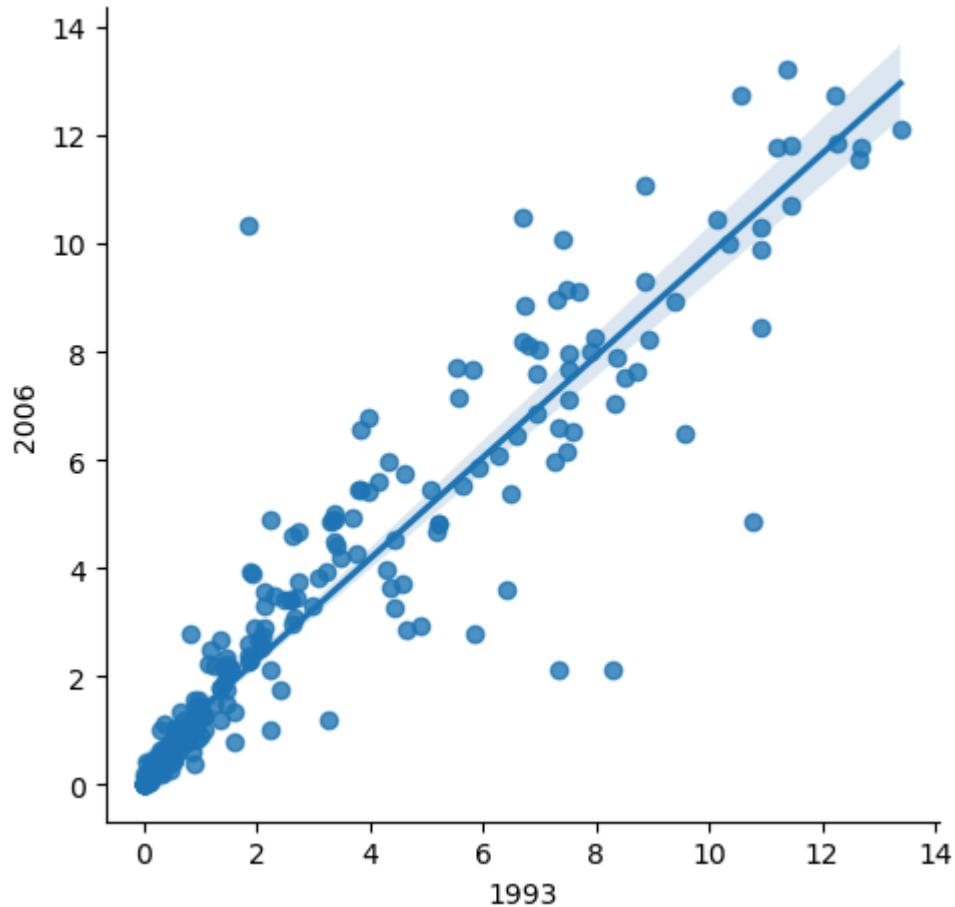
Scaterplot of 1993 vs 2005



Corelation between 1993 and 2005 : 0.9261063125523952

Corelation: Positively Corelated.

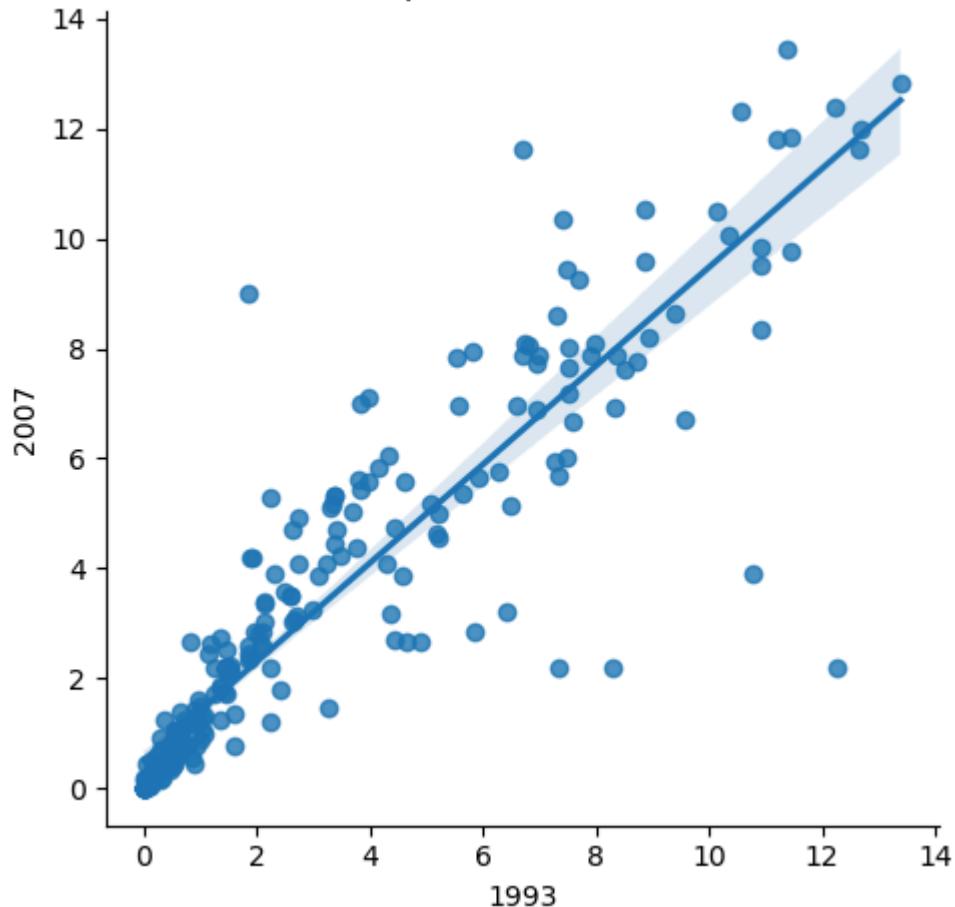
Scaterplot of 1993 vs 2006



Corelation between 1993 and 2006 : 0.9343606636082703

Corelation: Positively Corelated.

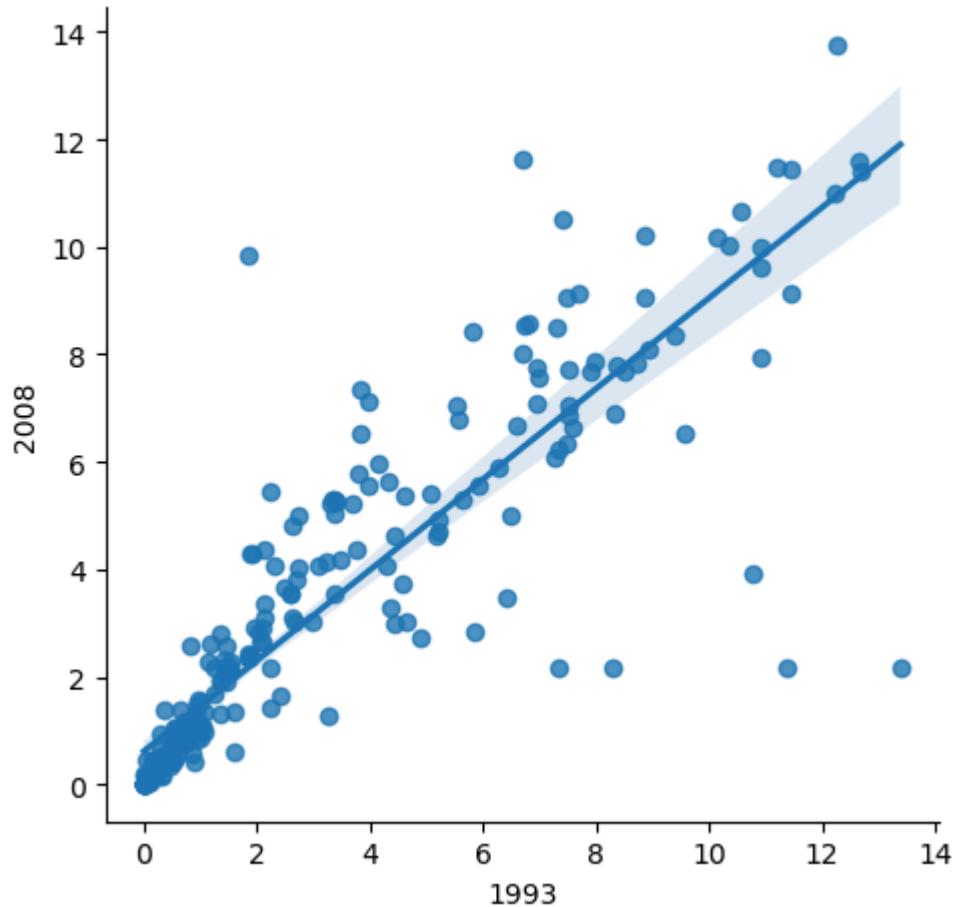
Scaterplot of 1993 vs 2007



Corelation between 1993 and 2007 : 0.9103178173914469

Corelation: Positively Corelated.

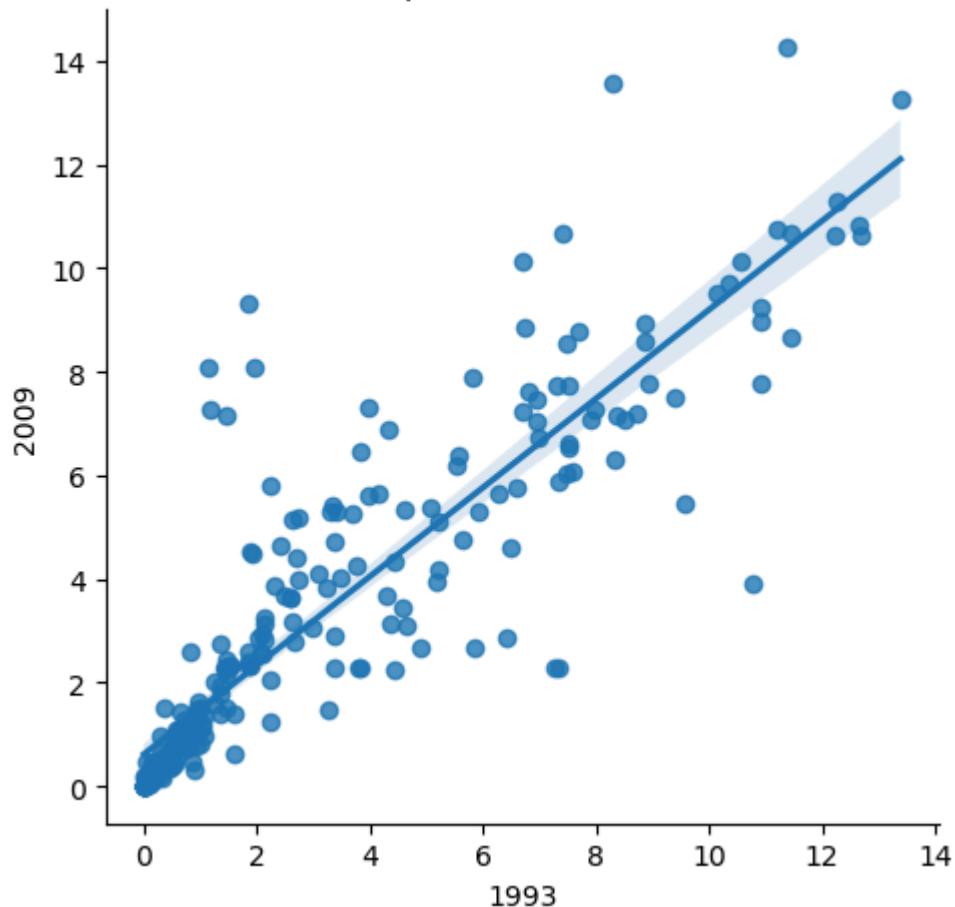
Scaterplot of 1993 vs 2008



Corelation between 1993 and 2008 : 0.8839277843108077

Corelation: Positively Corelated.

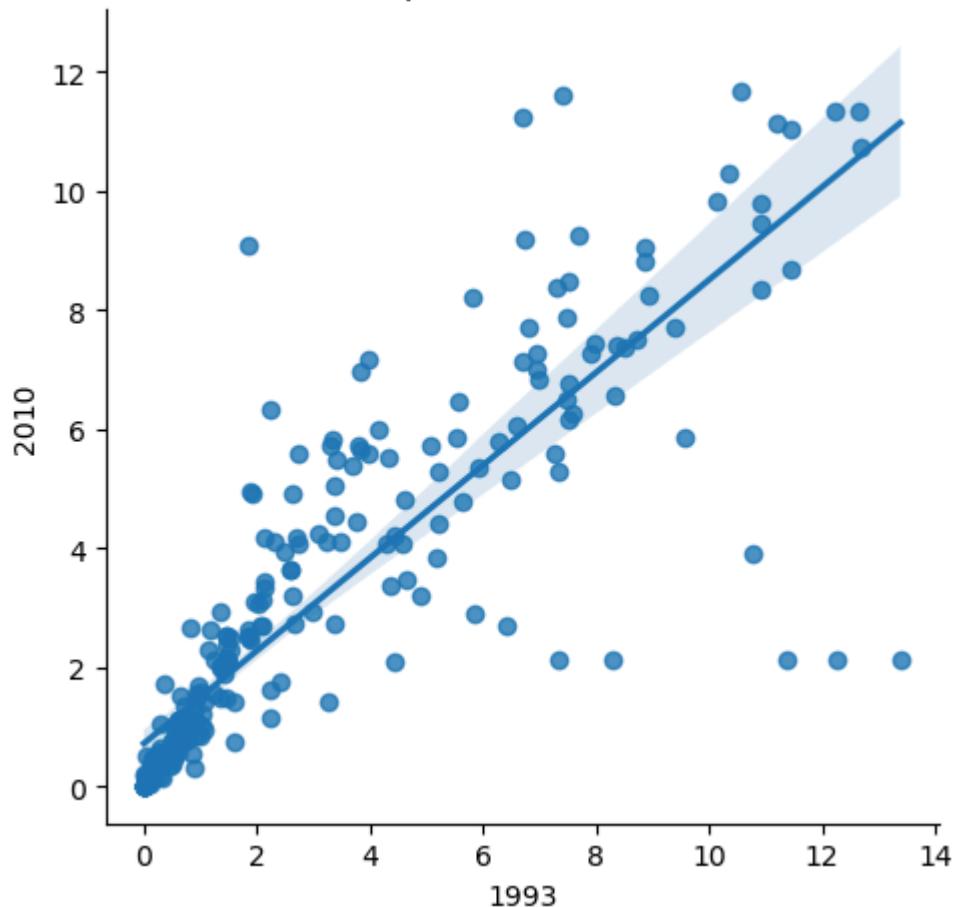
Scaterplot of 1993 vs 2009



Corelation between 1993 and 2009 : 0.8894316939831359

Corelation: Positively Corelated.

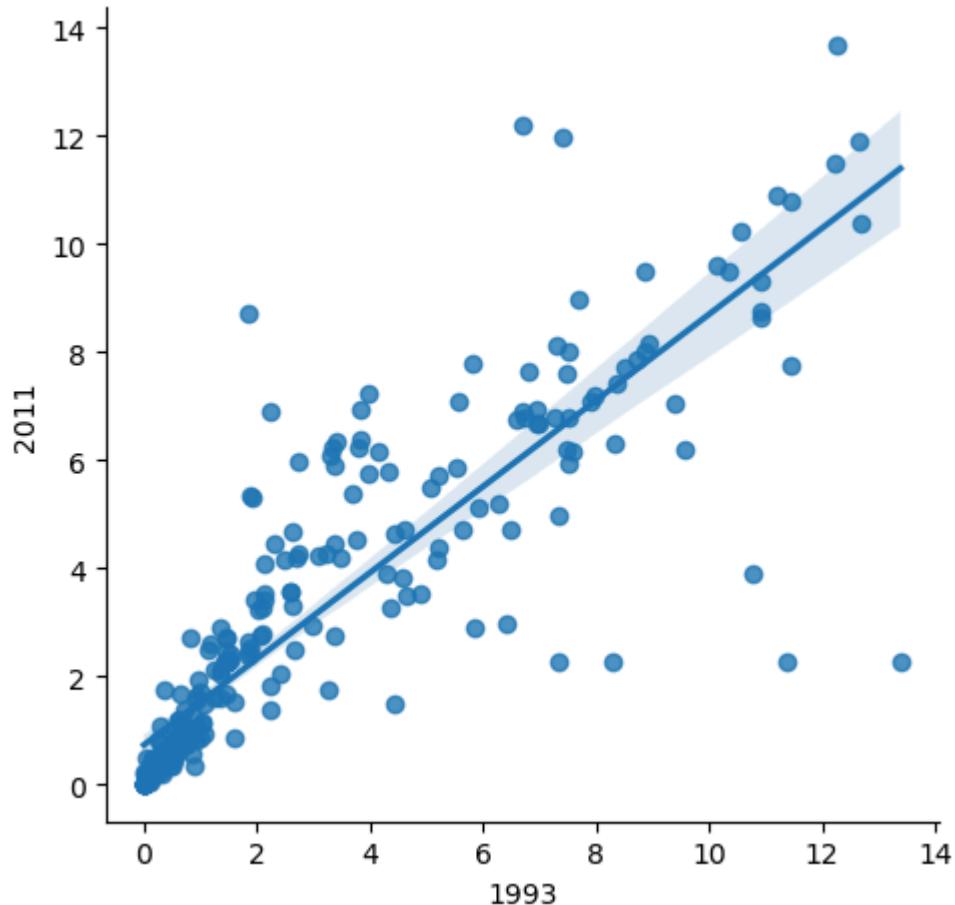
Scaterplot of 1993 vs 2010



Corelation between 1993 and 2010 : 0.855031985985132

Corelation: Positively Corelated.

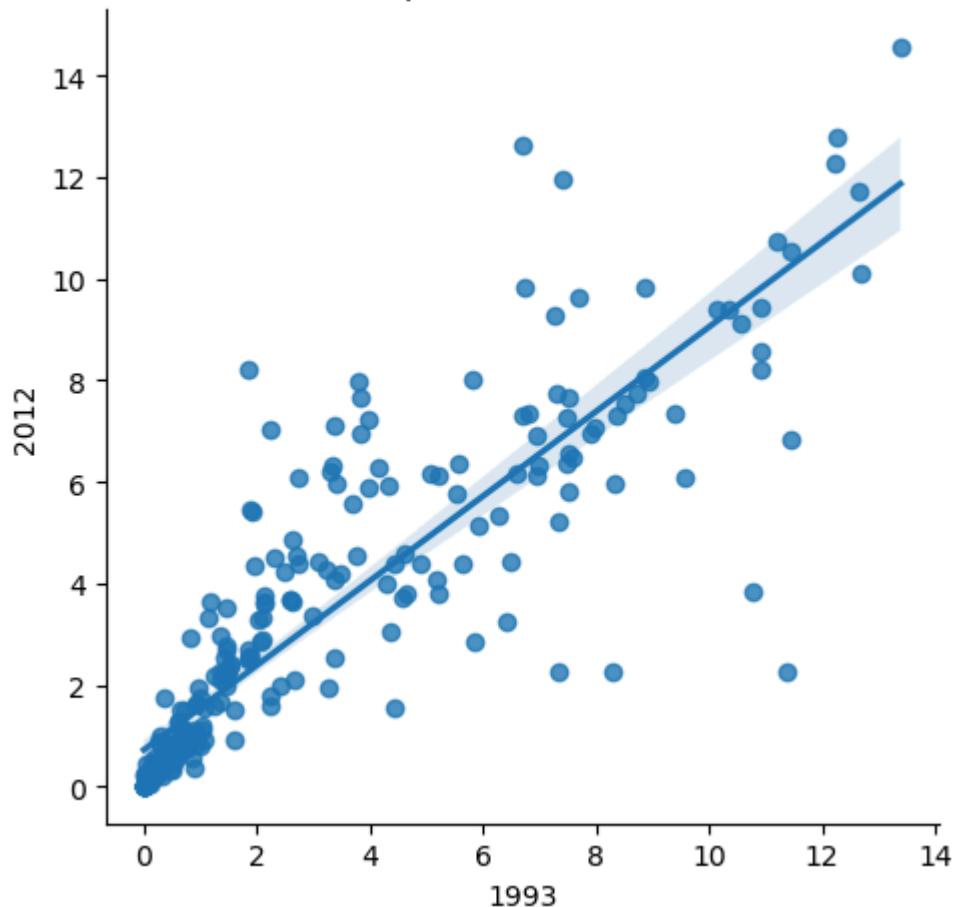
Scaterplot of 1993 vs 2011



Corelation between 1993 and 2011 : 0.8670397610493806

Corelation: Positively Corelated.

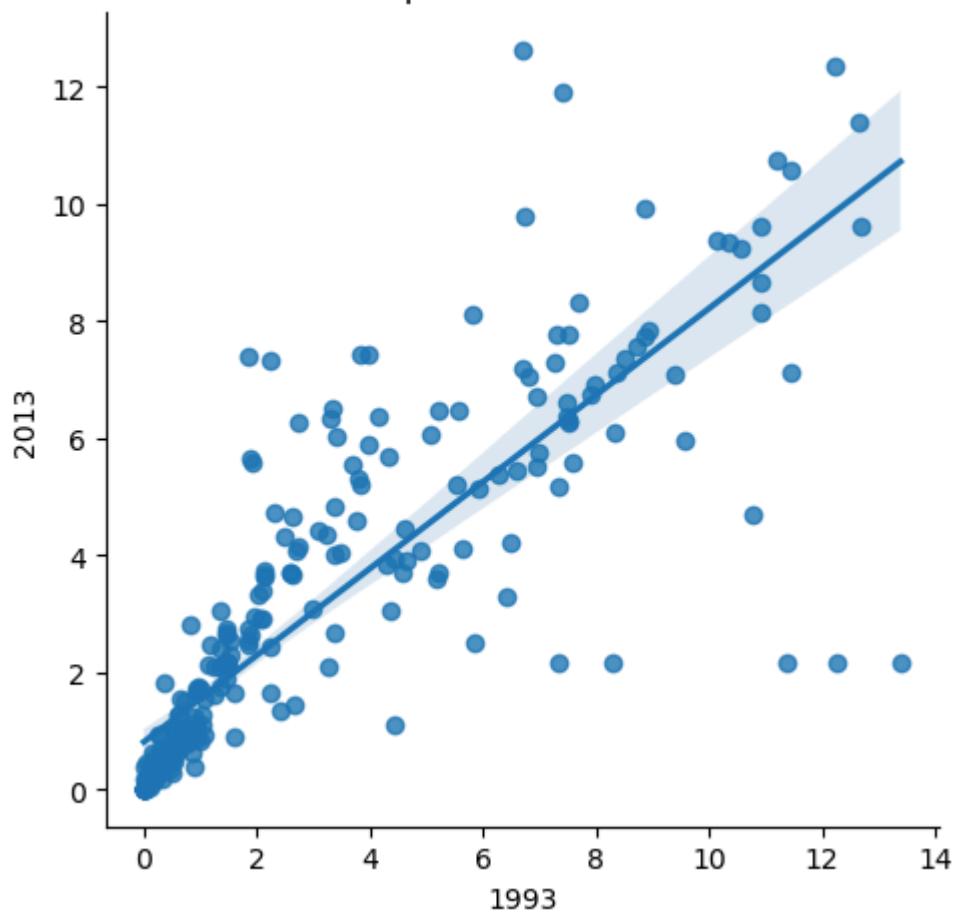
Scaterplot of 1993 vs 2012



Corelation between 1993 and 2012 : 0.8780669976195348

Corelation: Positively Corelated.

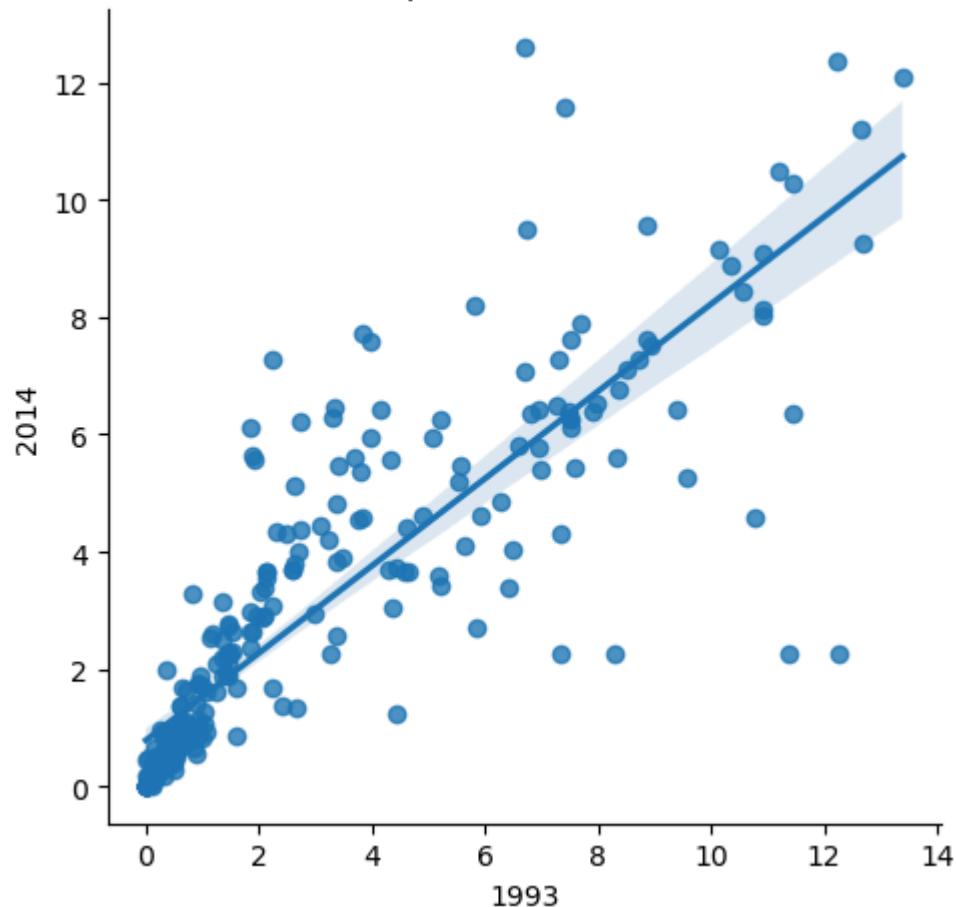
Scaterplot of 1993 vs 2013



Corelation between 1993 and 2013 : 0.8387551576207609

Corelation: Positively Corelated.

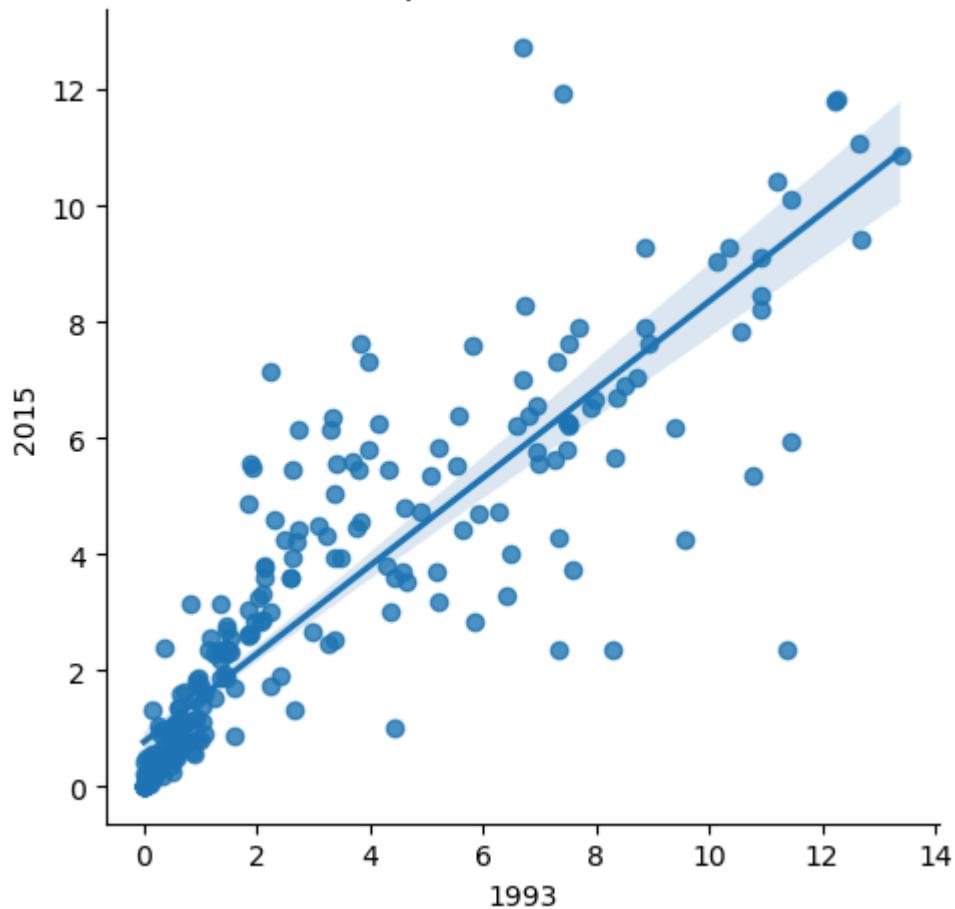
Scaterplot of 1993 vs 2014



Corelation between 1993 and 2014 : 0.856679110367867

Corelation: Positively Corelated.

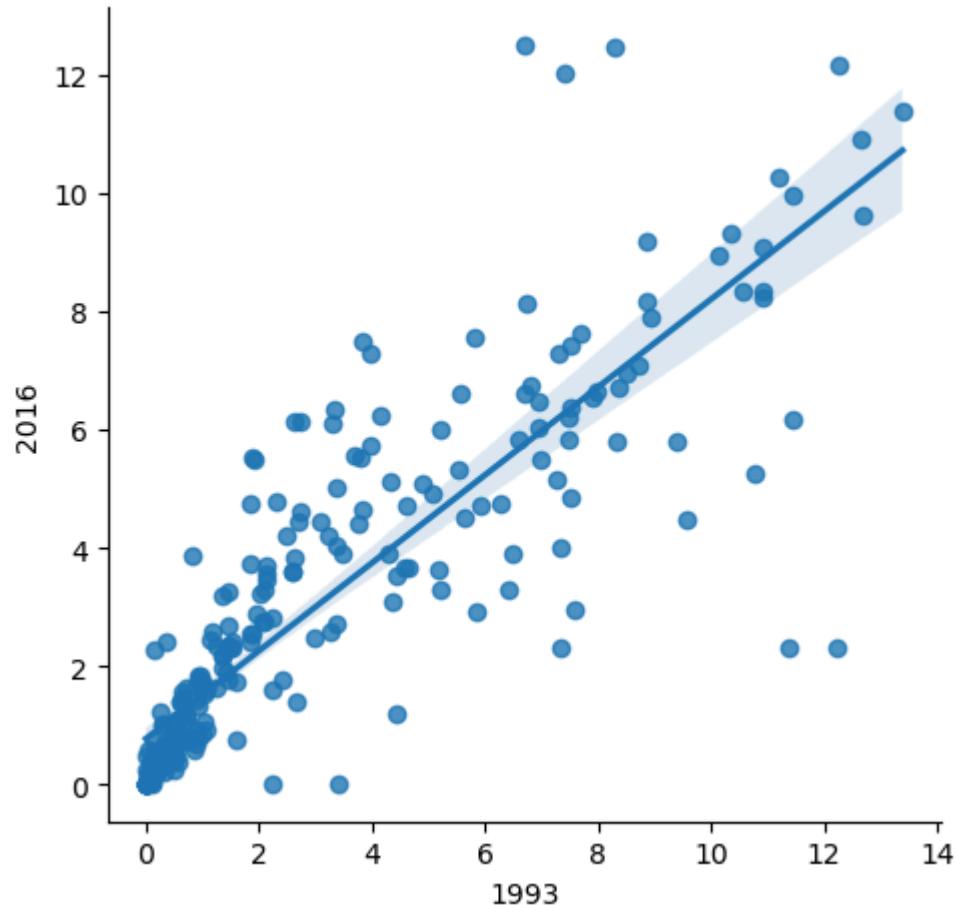
Scaterplot of 1993 vs 2015



Corelation between 1993 and 2015 : 0.8745357663902413

Corelation: Positively Corelated.

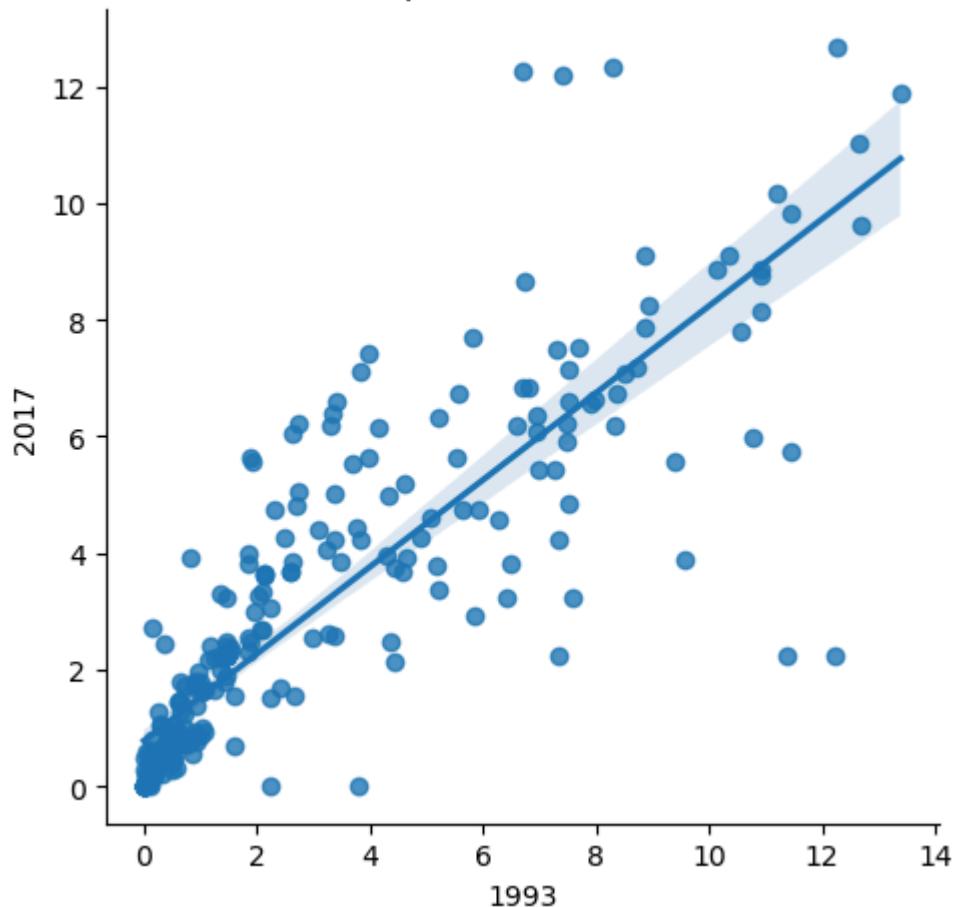
Scaterplot of 1993 vs 2016



Corelation between 1993 and 2016 : 0.8579985713014024

Corelation: Positively Corelated.

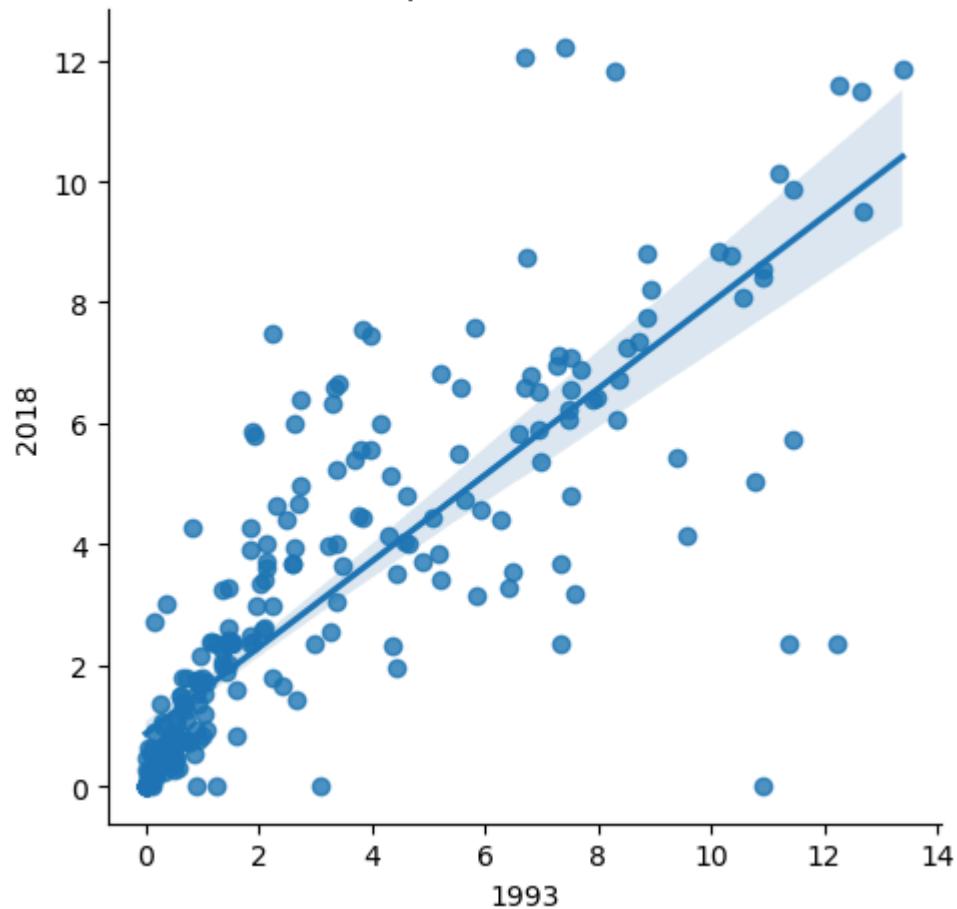
Scaterplot of 1993 vs 2017



Corelation between 1993 and 2017 : 0.8557948420965309

Corelation: Positively Corelated.

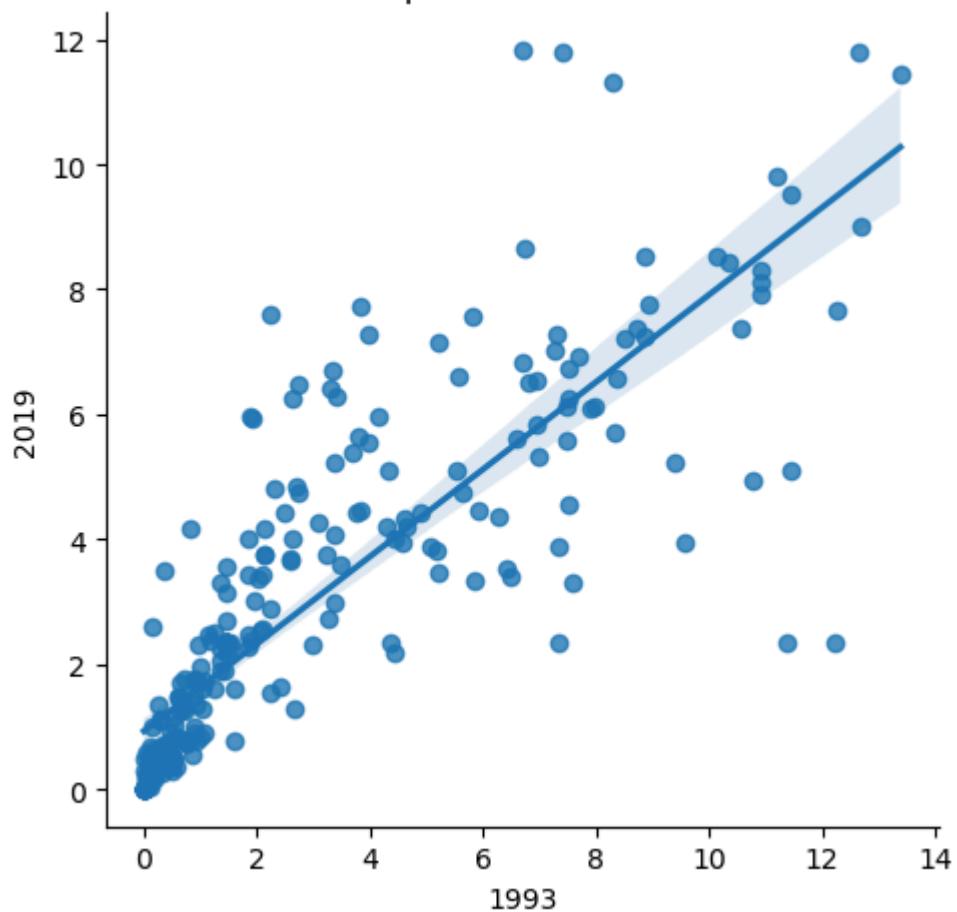
Scaterplot of 1993 vs 2018



Corelation between 1993 and 2018 : 0.8247376797808702

Corelation: Positively Corelated.

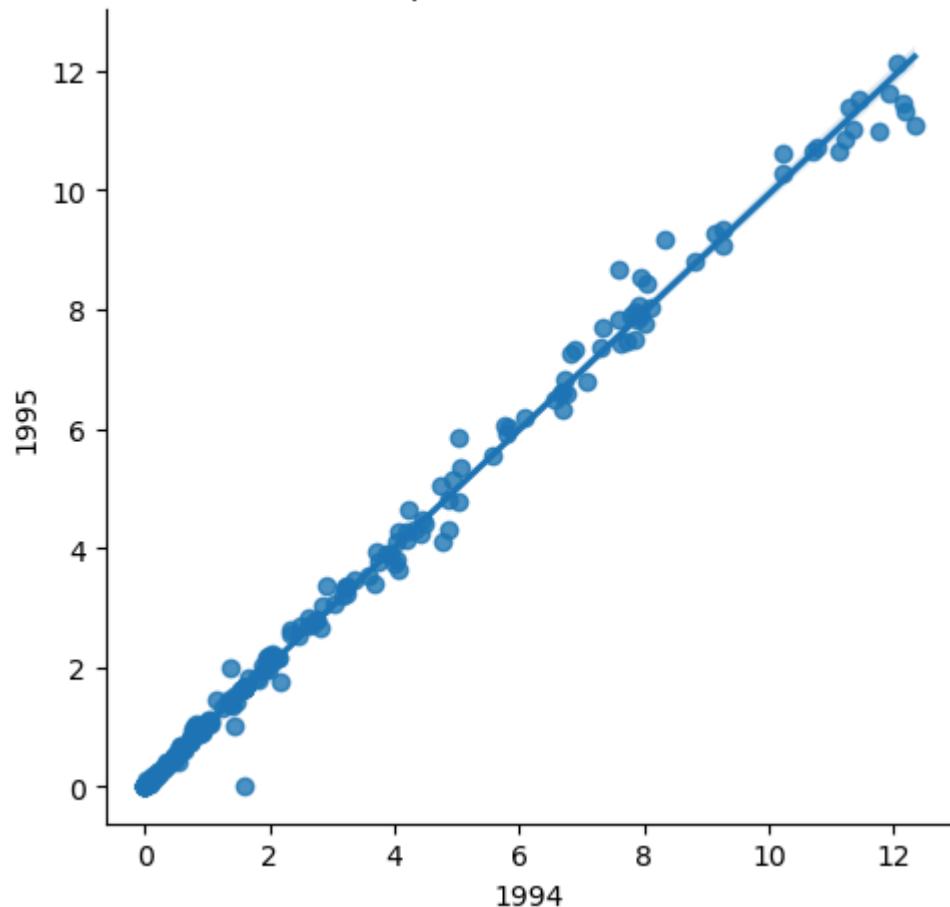
Scaterplot of 1993 vs 2019



Corelation between 1993 and 2019 : 0.8367925442762142

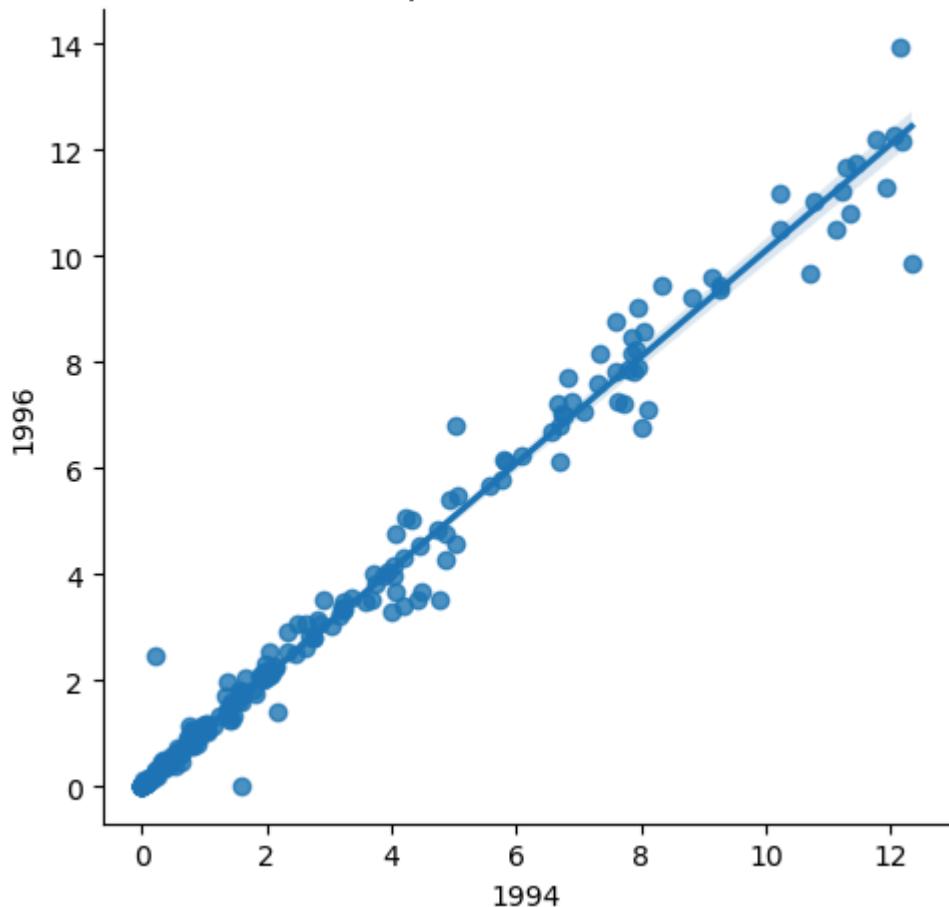
Corelation: Positively Corelated.

Scaterplot of 1994 vs 1995



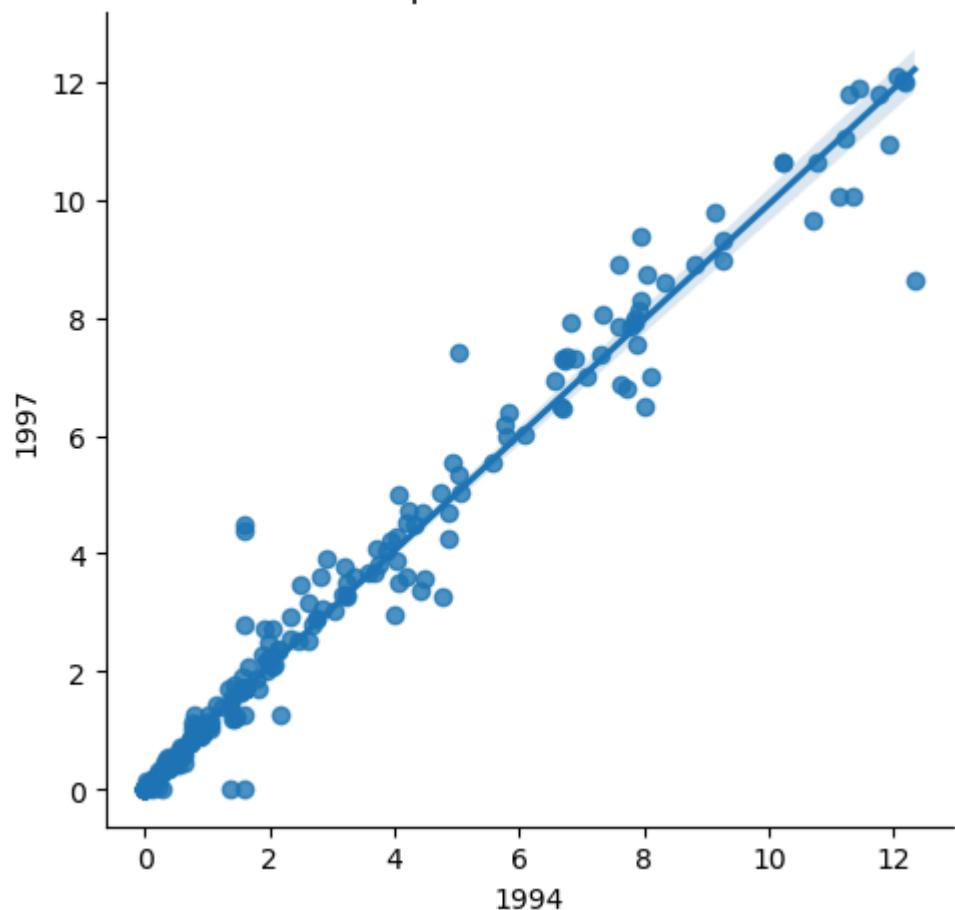
Corelation between 1994 and 1995 : 0.9973007324115369

Corelation: Positively Corelated.

Scaterplot of 1994 vs 1996

Corelation between 1994 and 1996 : 0.9920715565831534

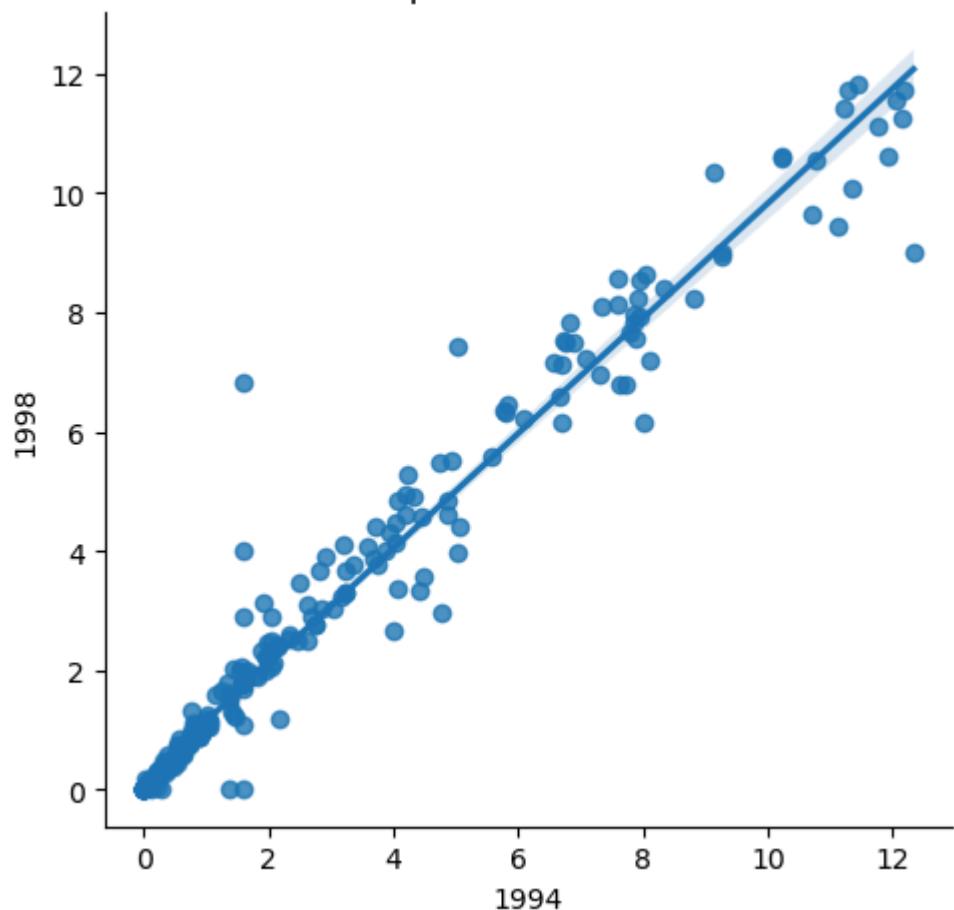
Corelation: Positively Corelated.

Scaterplot of 1994 vs 1997

Corelation between 1994 and 1997 : 0.9859684811394418

Corelation: Positively Corelated.

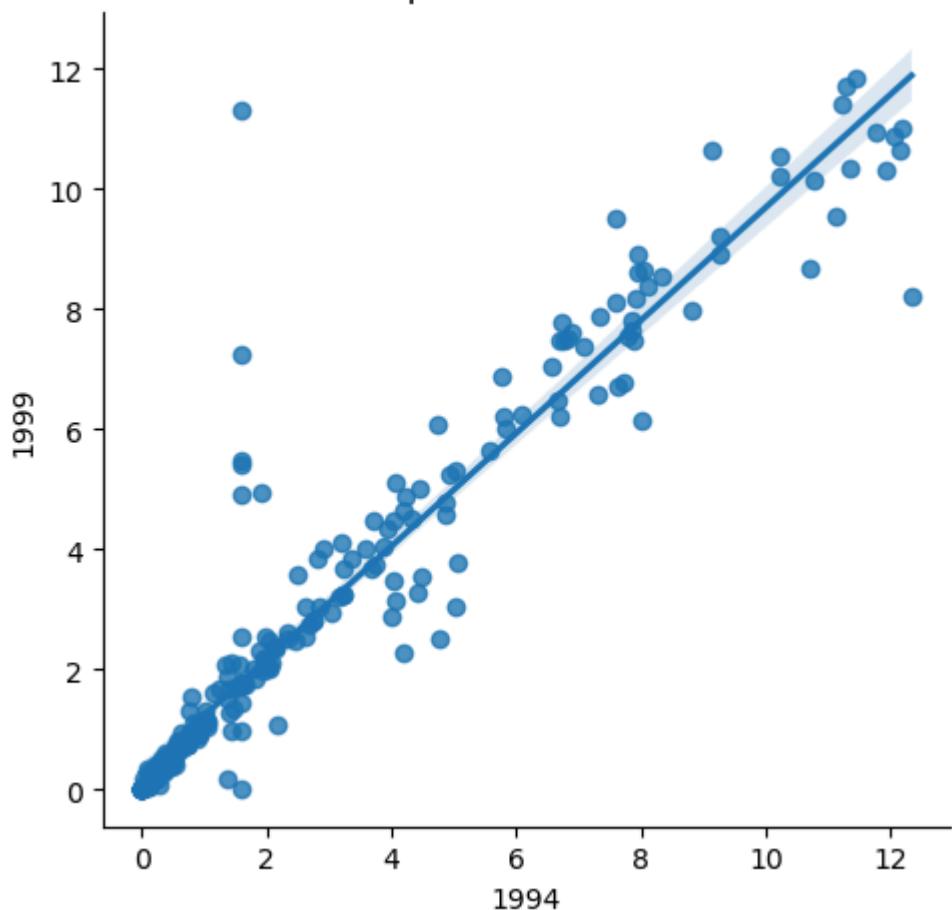
Scaterplot of 1994 vs 1998



Corelation between 1994 and 1998 : 0.98079525321511

Corelation: Positively Corelated.

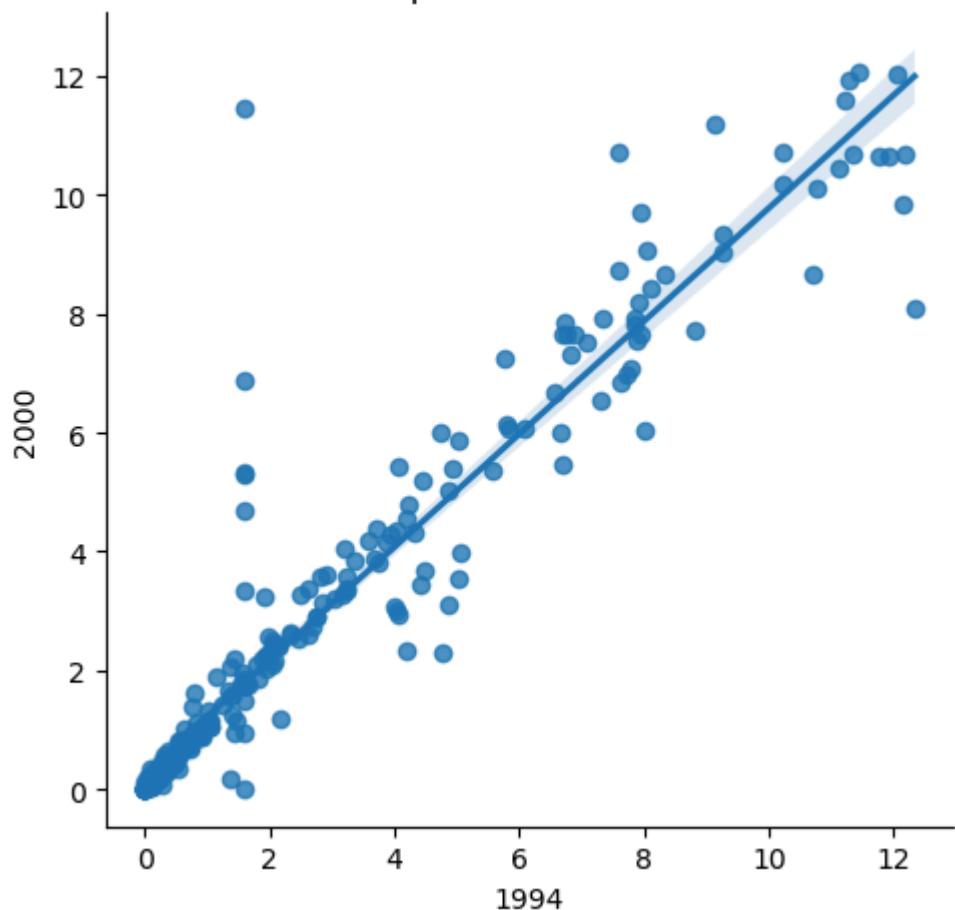
Scaterplot of 1994 vs 1999



Corelation between 1994 and 1999 : 0.9512138320923189

Corelation: Positively Corelated.

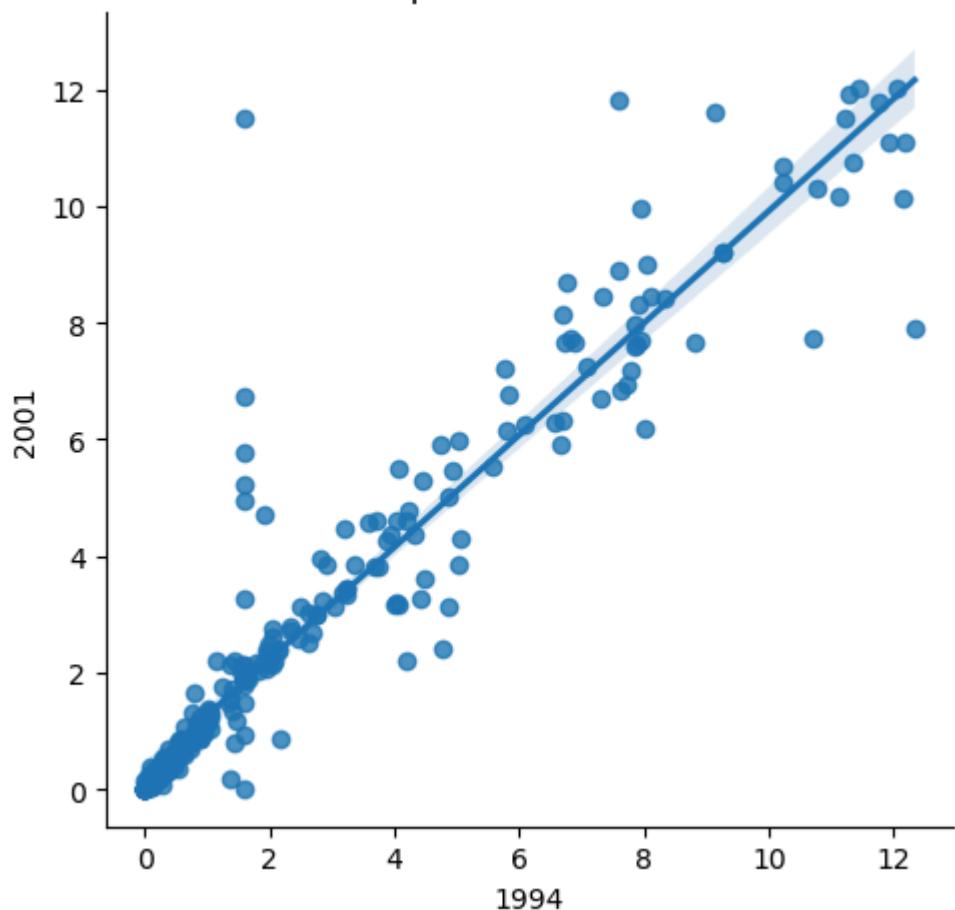
Scaterplot of 1994 vs 2000



Corelation between 1994 and 2000 : 0.9501036708488645

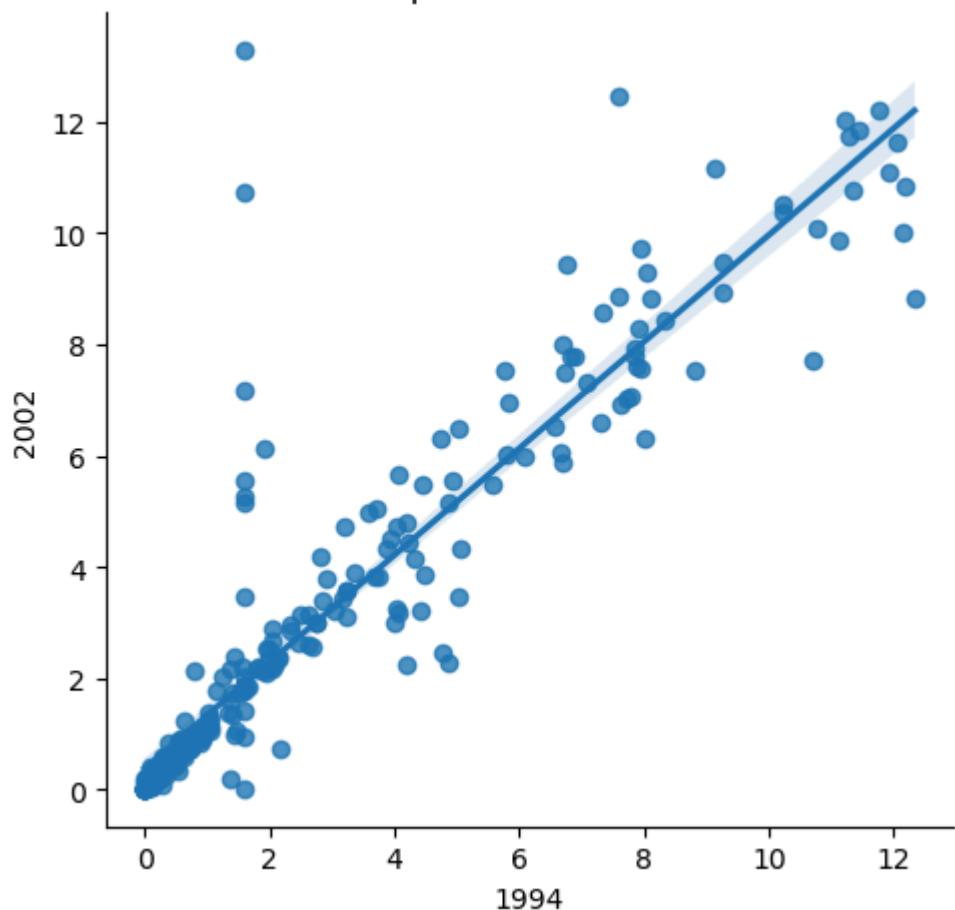
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2001



Corelation between 1994 and 2001 : 0.9461372019343572

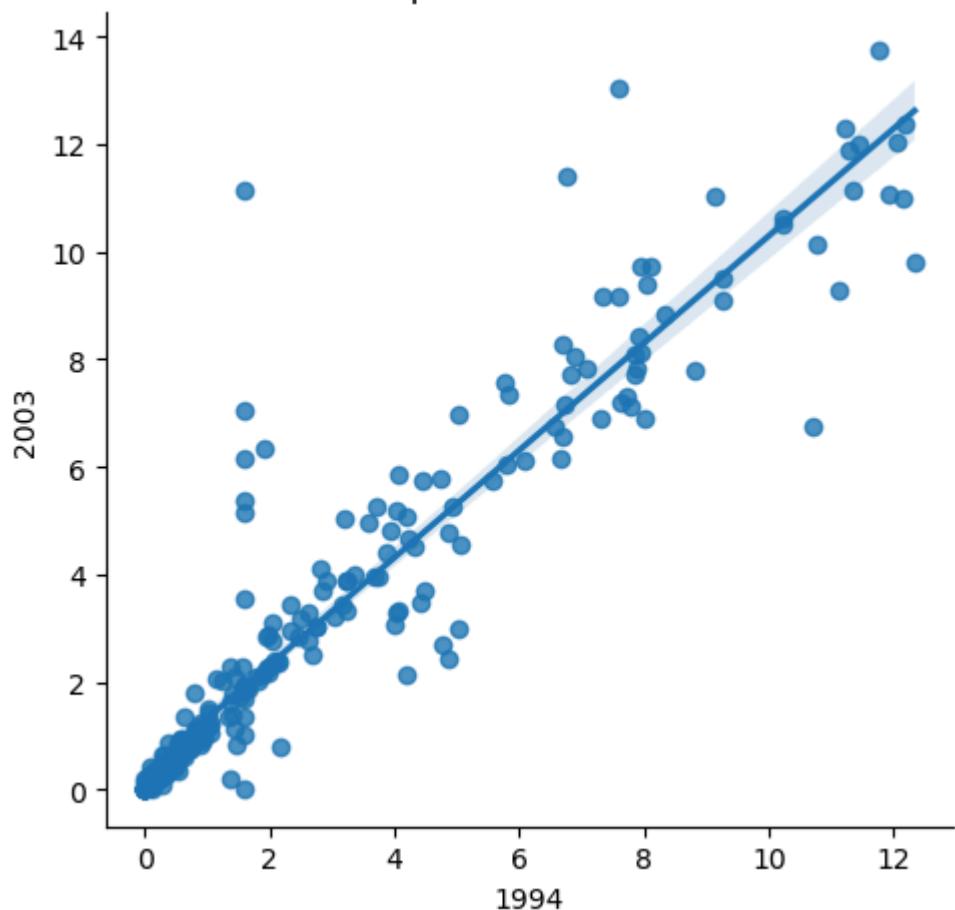
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2002

Corelation between 1994 and 2002 : 0.9224511761023566

Corelation: Positively Corelated.

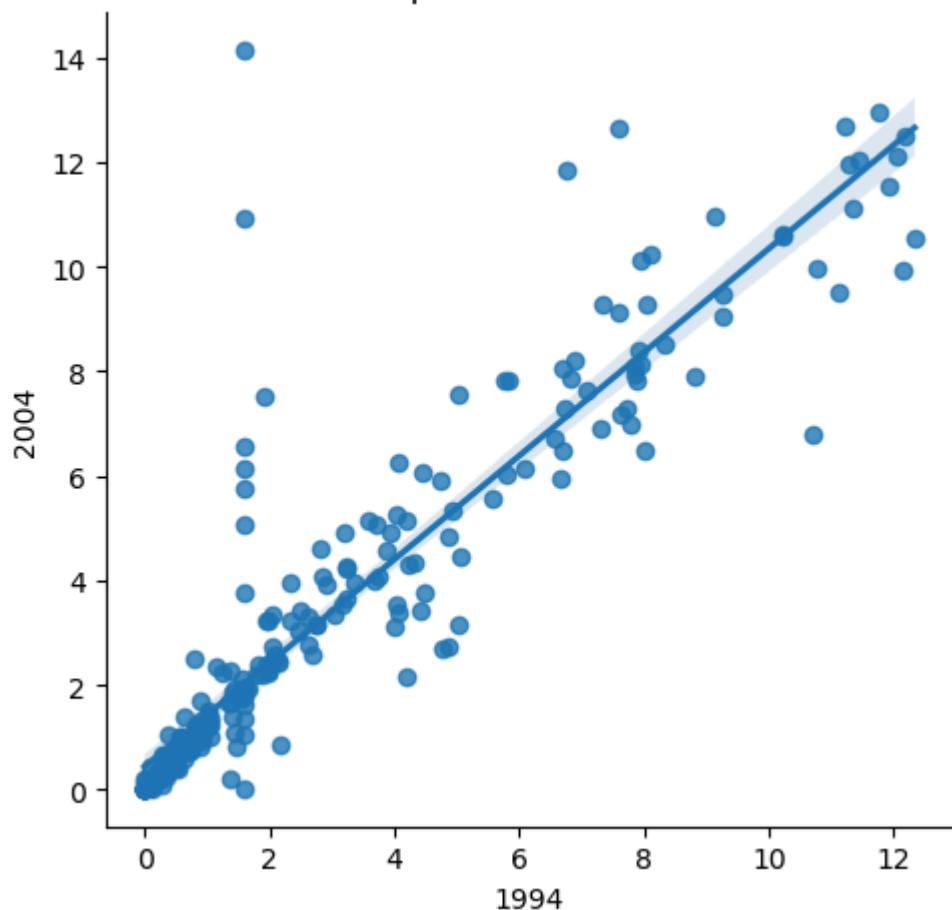
Scaterplot of 1994 vs 2003



Corelation between 1994 and 2003 : 0.9413485950253171

Corelation: Positively Corelated.

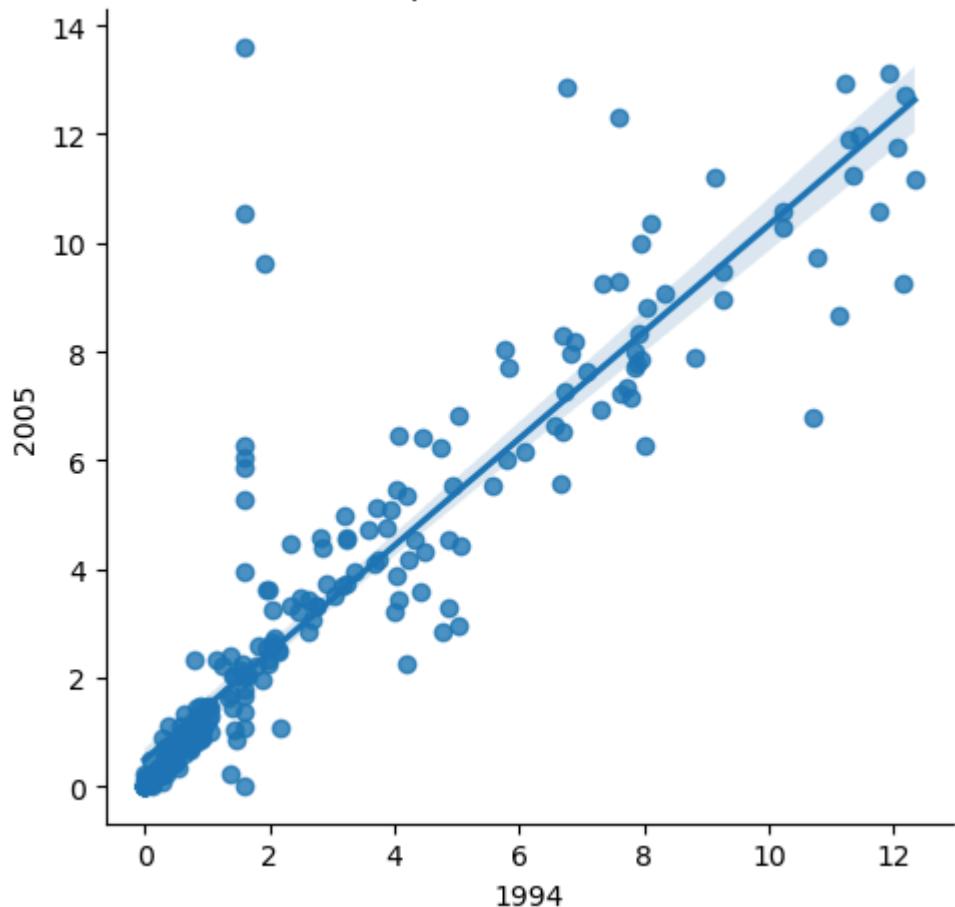
Scaterplot of 1994 vs 2004



Corelation between 1994 and 2004 : 0.9160906654143258

Corelation: Positively Corelated.

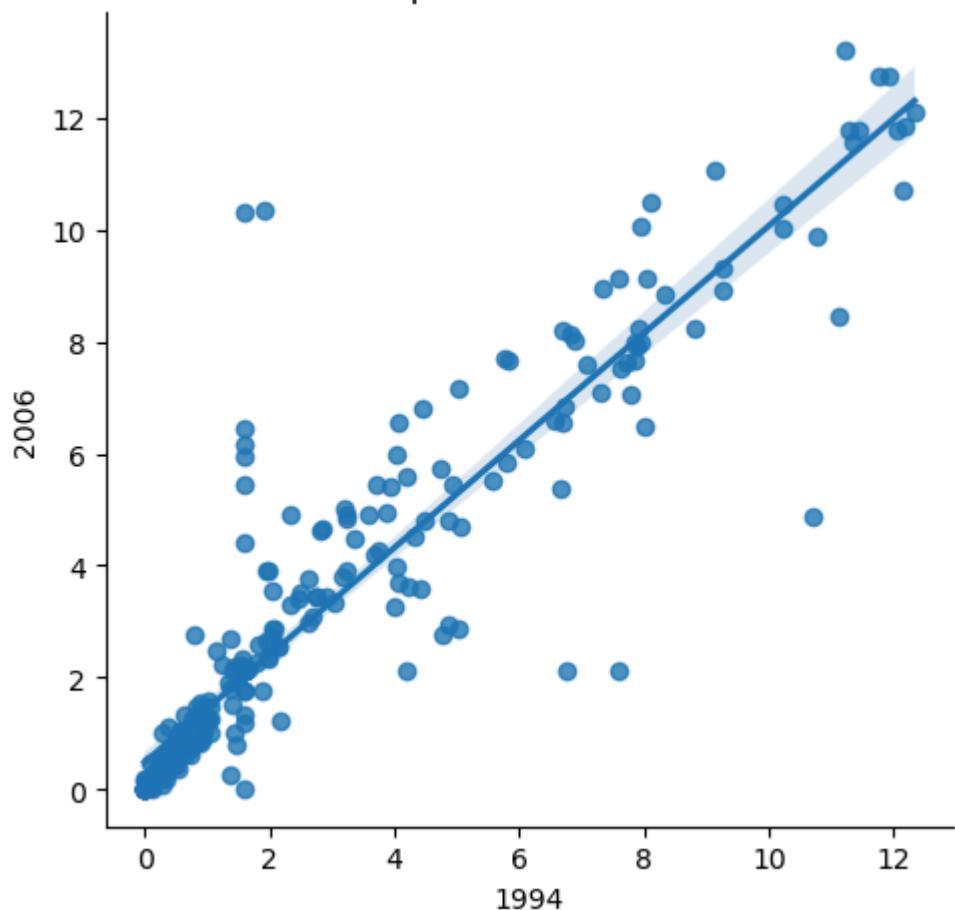
Scaterplot of 1994 vs 2005



Corelation between 1994 and 2005 : 0.9115056429130667

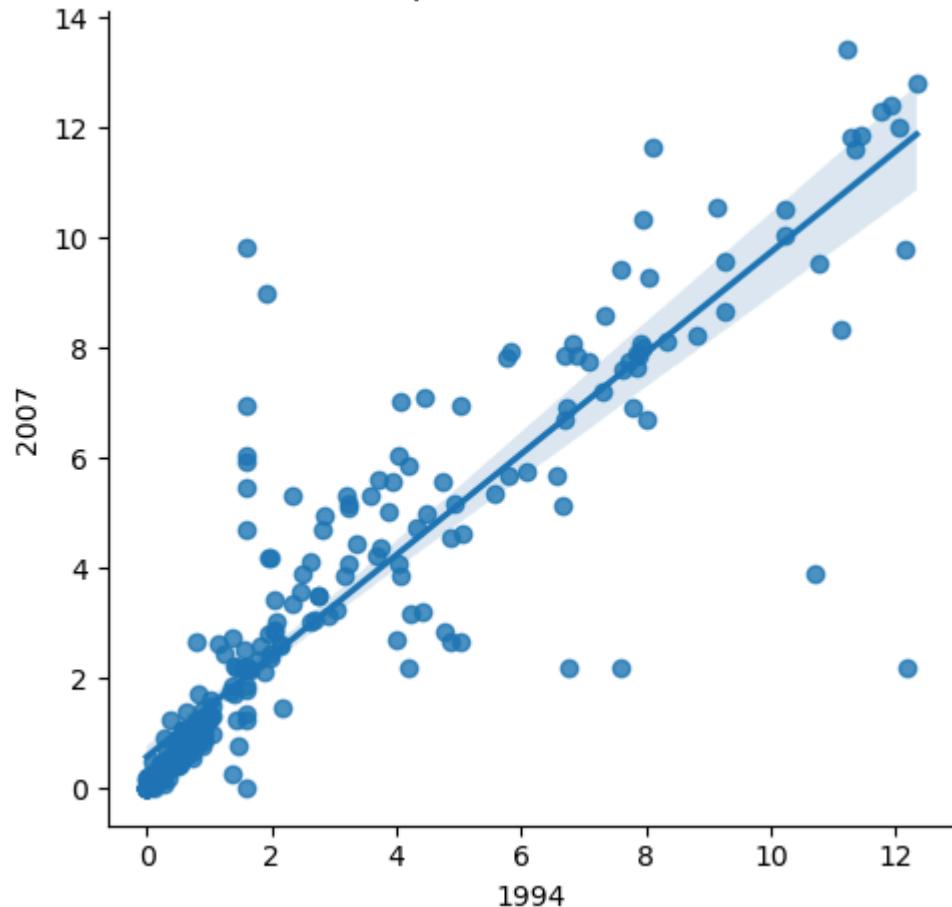
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2006



Corelation between 1994 and 2006 : 0.9214165808131709

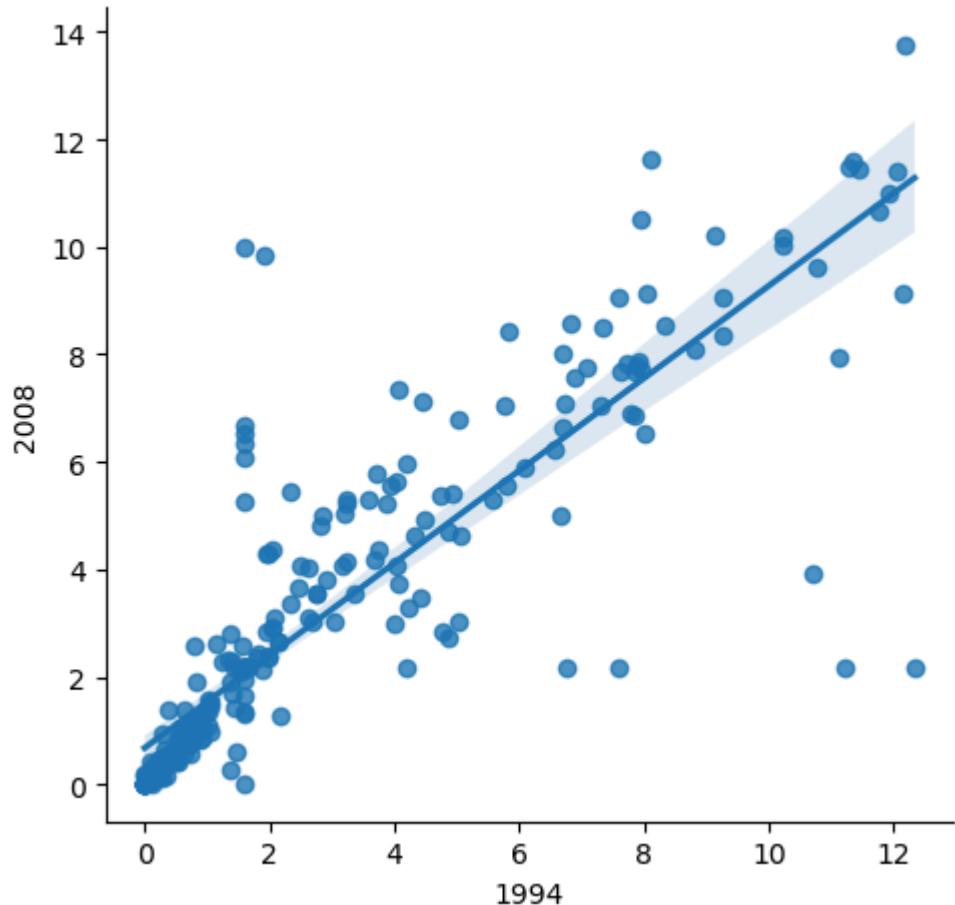
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2007

Corelation between 1994 and 2007 : 0.896297078429882

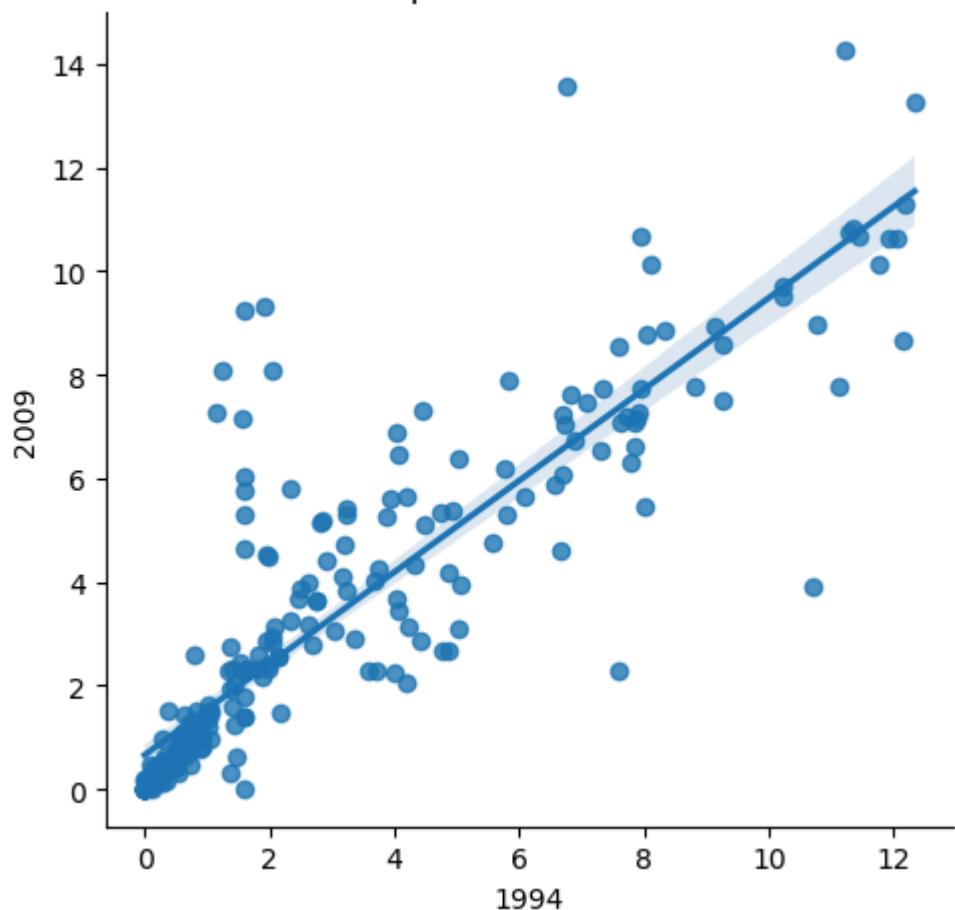
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2008



Corelation between 1994 and 2008 : 0.8682391620865619

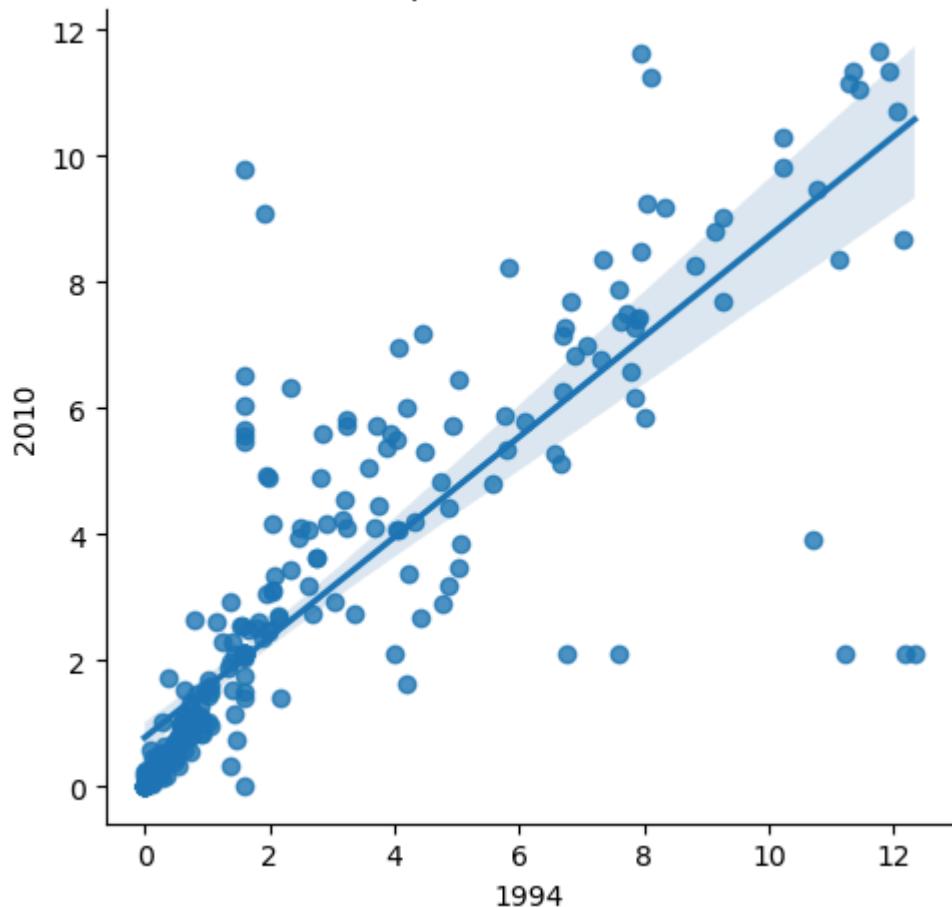
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Scaterplot of 1994 vs 2009

Corelation between 1994 and 2009 : 0.881086727797685

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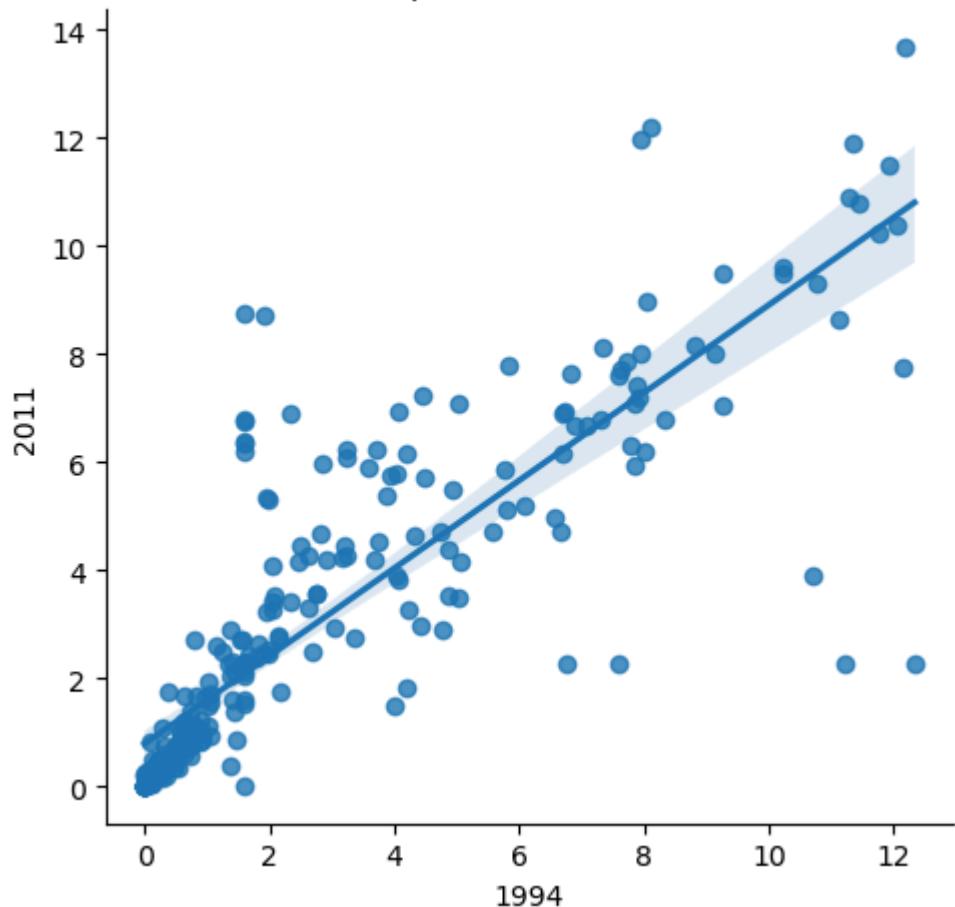
Scaterplot of 1994 vs 2010



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Corelation: Positively Corelated.

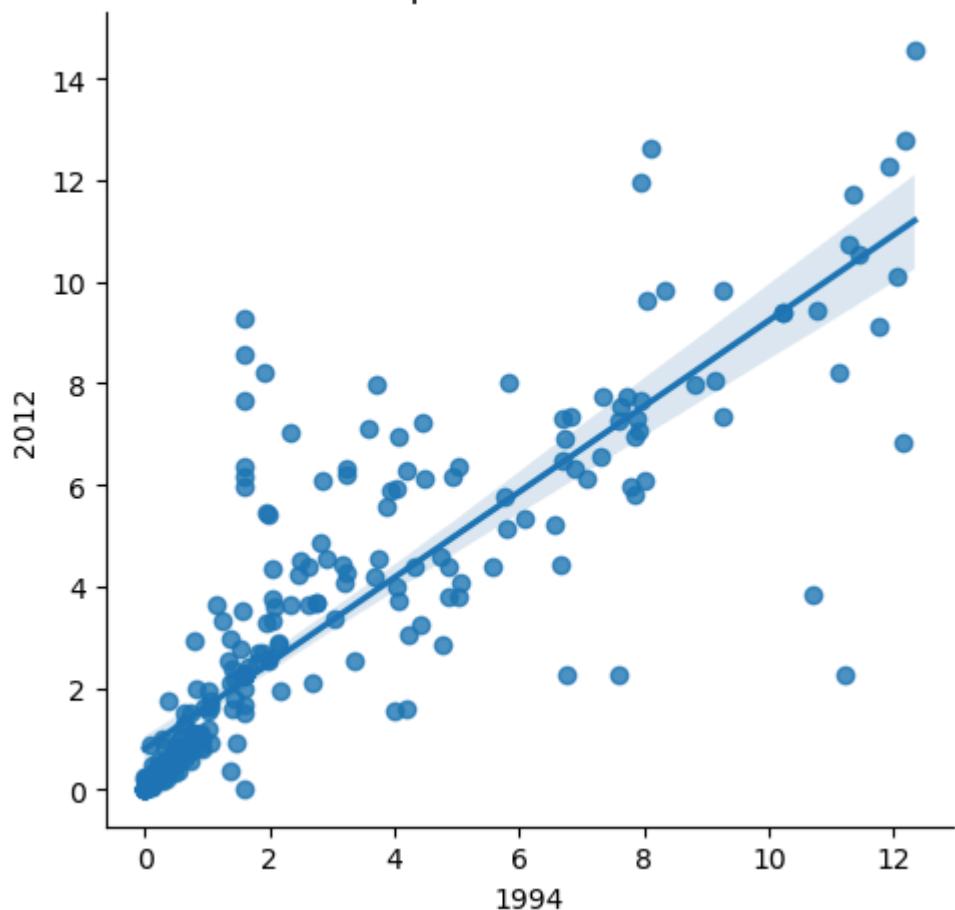
Scaterplot of 1994 vs 2011



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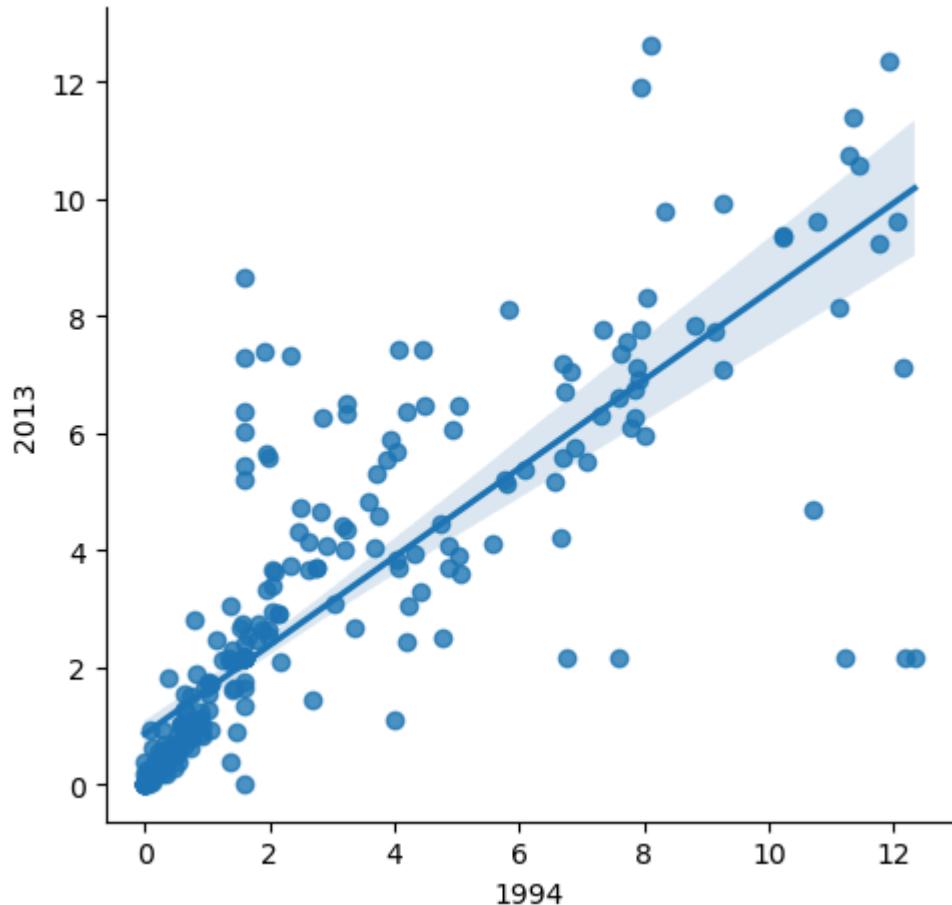
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Corelation: Positively Corelated.

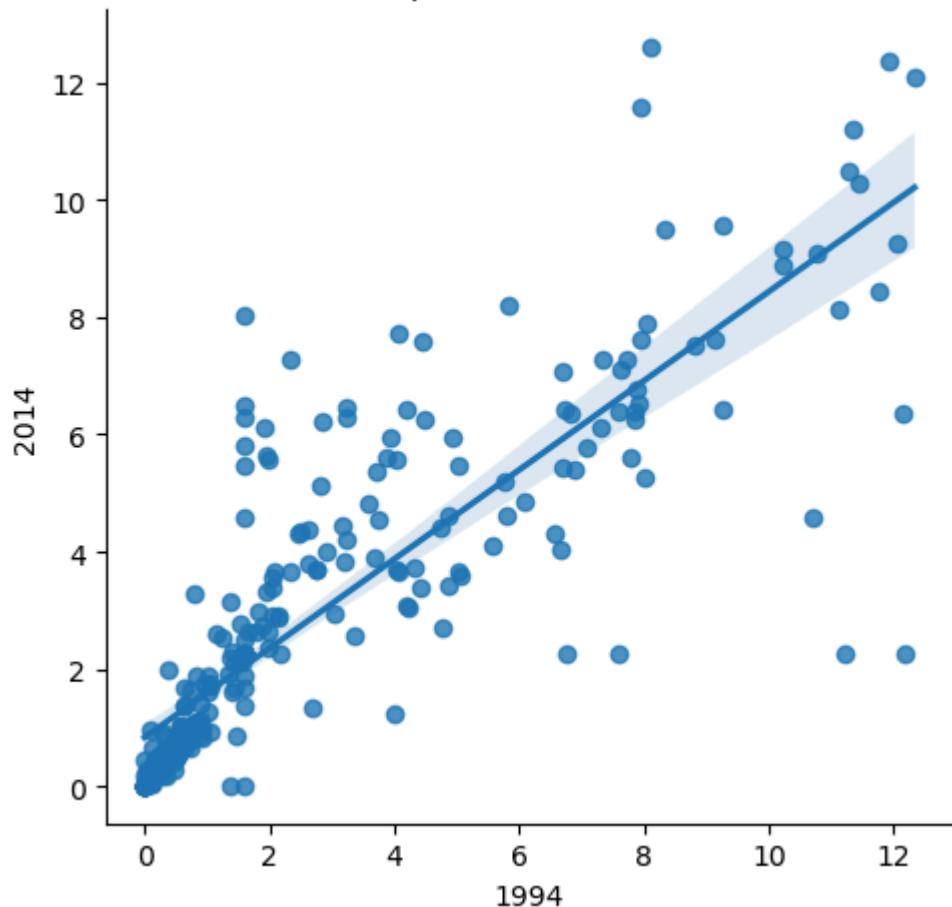
Scaterplot of 1994 vs 2013



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Corelation: Positively Corelated.

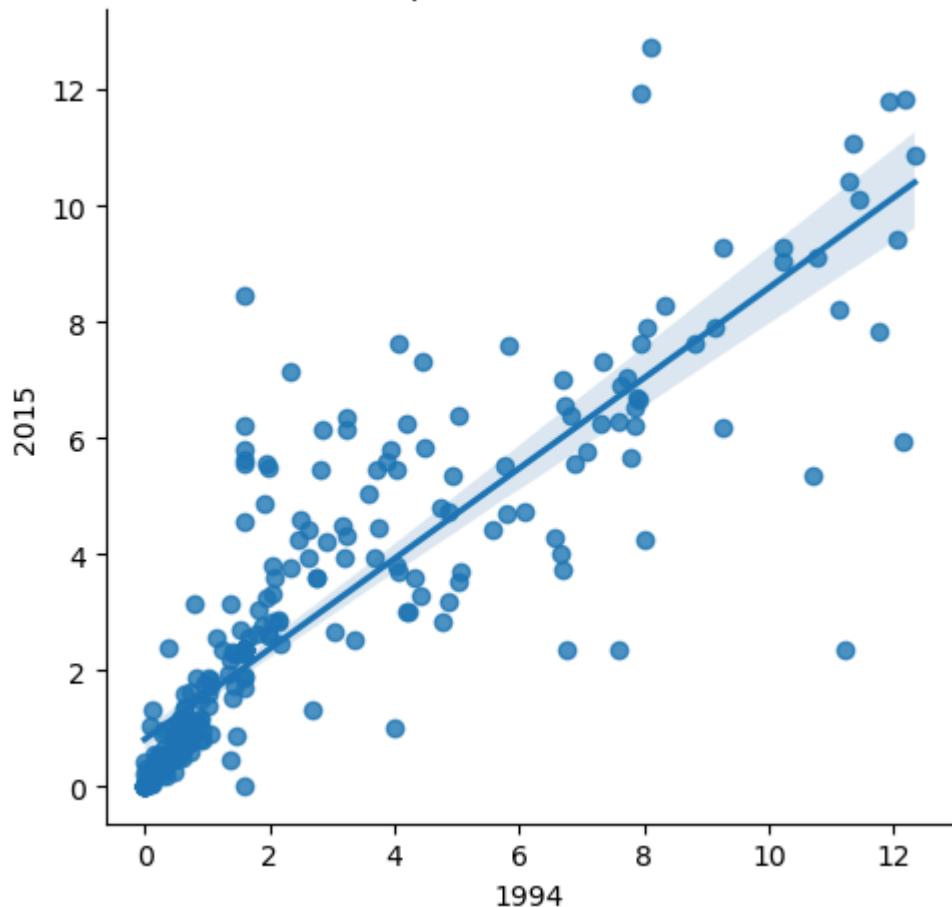
Scaterplot of 1994 vs 2014



Corelation between 1994 and 2014 : 0.8432080320855984

Corelation: Positively Corelated.

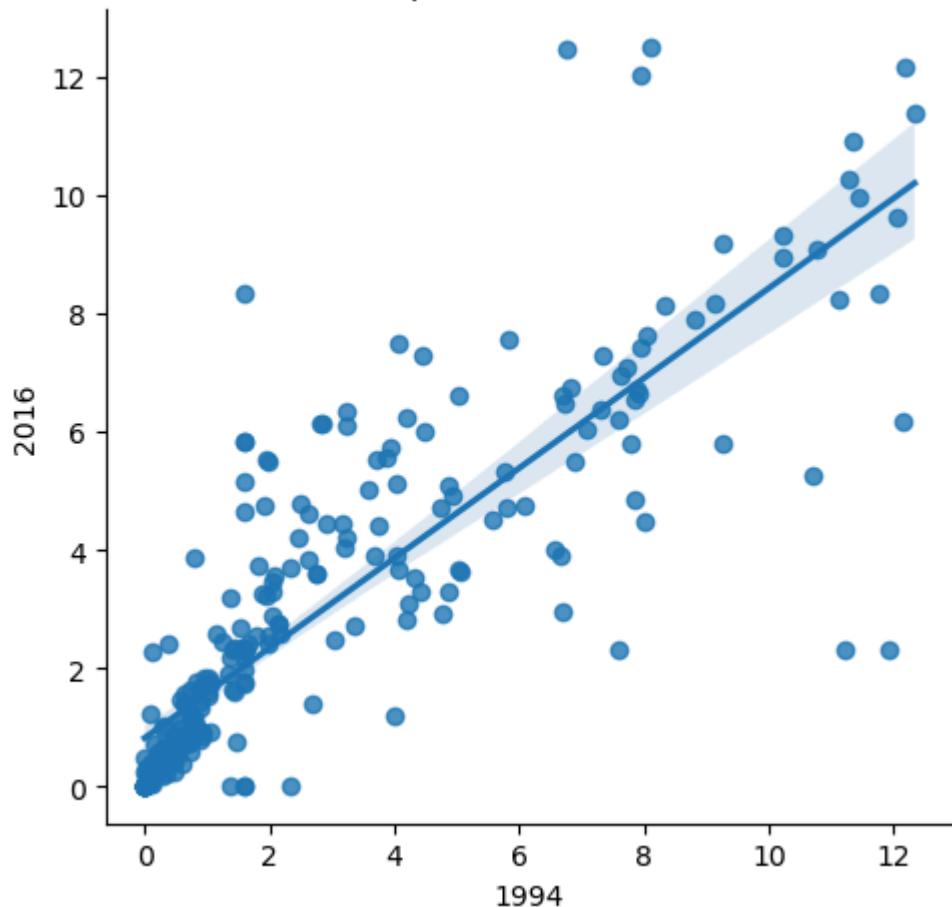
Scaterplot of 1994 vs 2015



Corelation between 1994 and 2015 : 0.8632315052548291

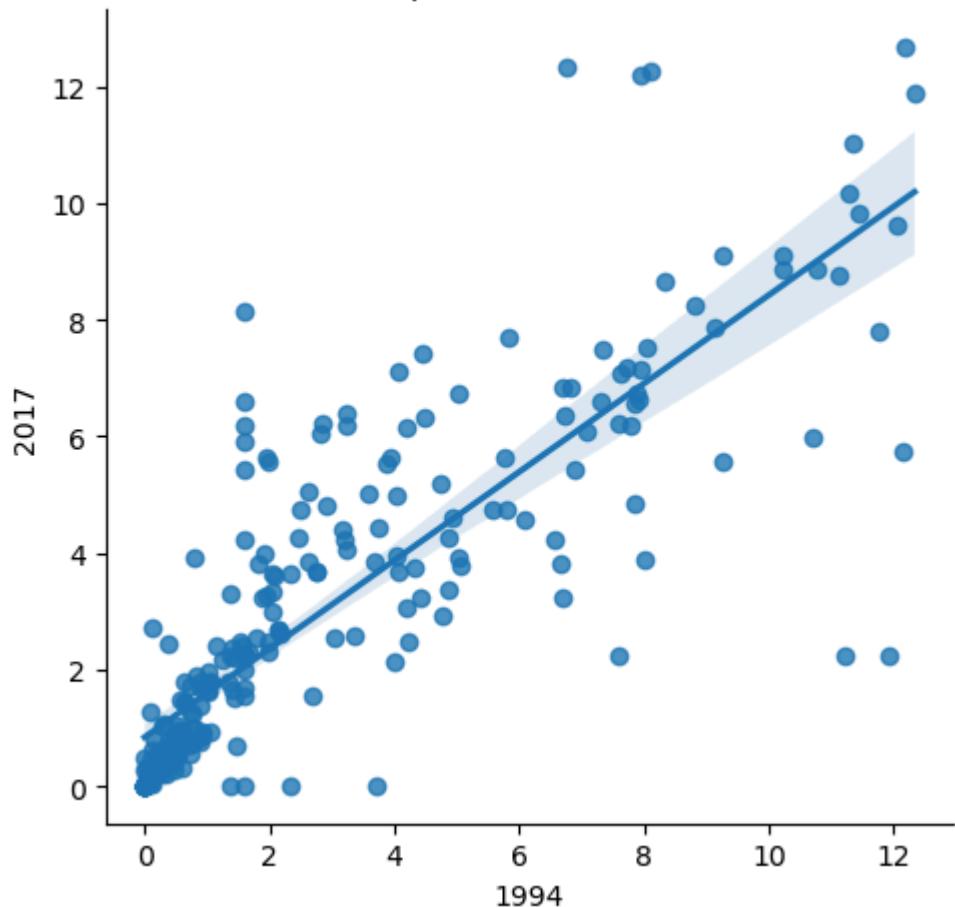
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2016



Corelation between 1994 and 2016 : 0.8456720527502356

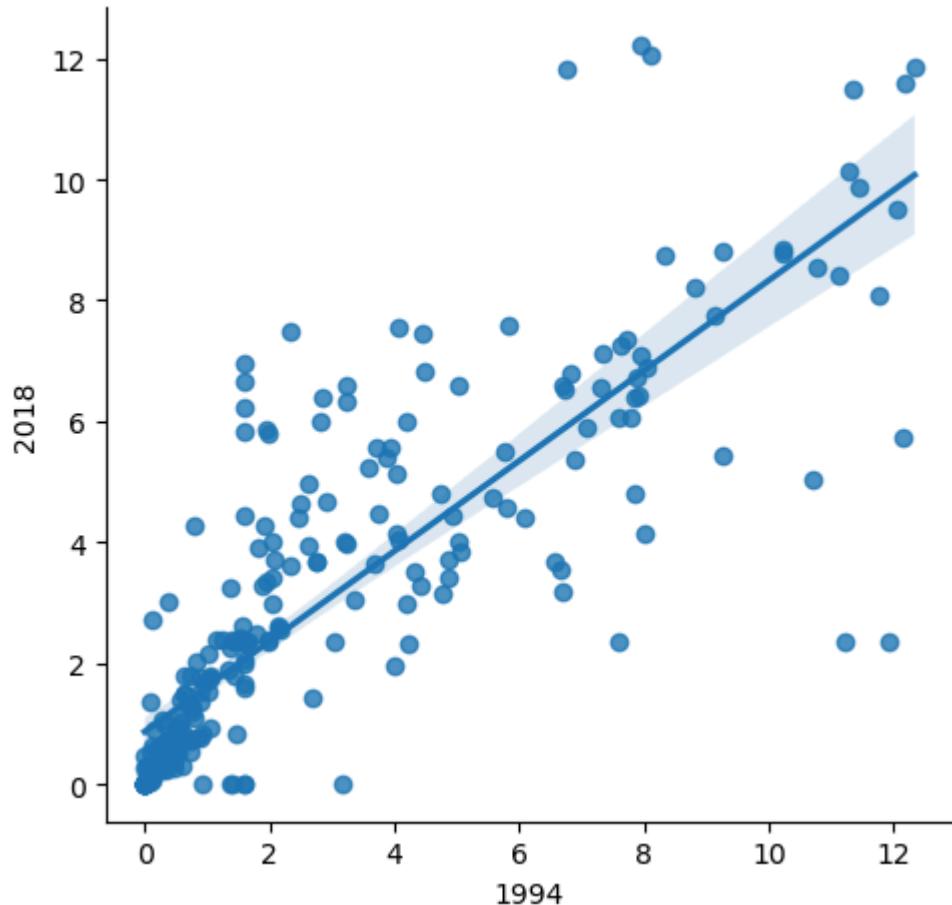
Corelation: Positively Corelated.

Scaterplot of 1994 vs 2017

Corelation between 1994 and 2017 : 0.8382519499783551

Corelation: Positively Corelated.

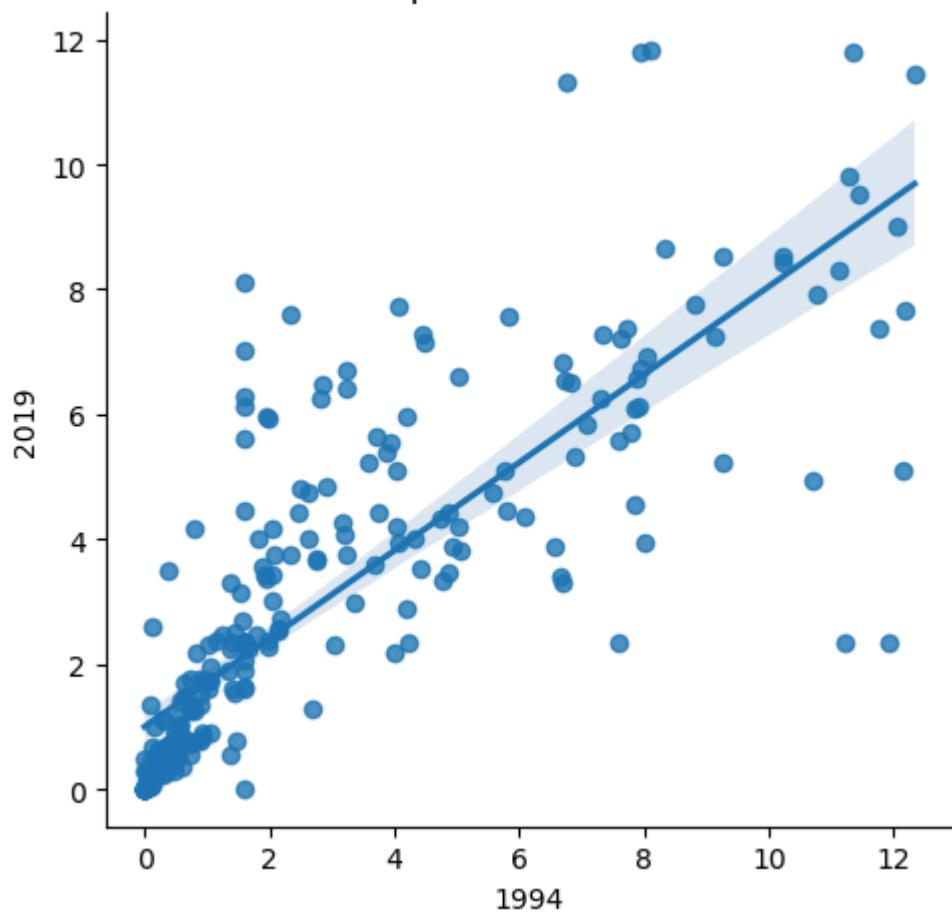
Scaterplot of 1994 vs 2018



Corelation between 1994 and 2018 : 0.8318983635991243

Corelation: Positively Corelated.

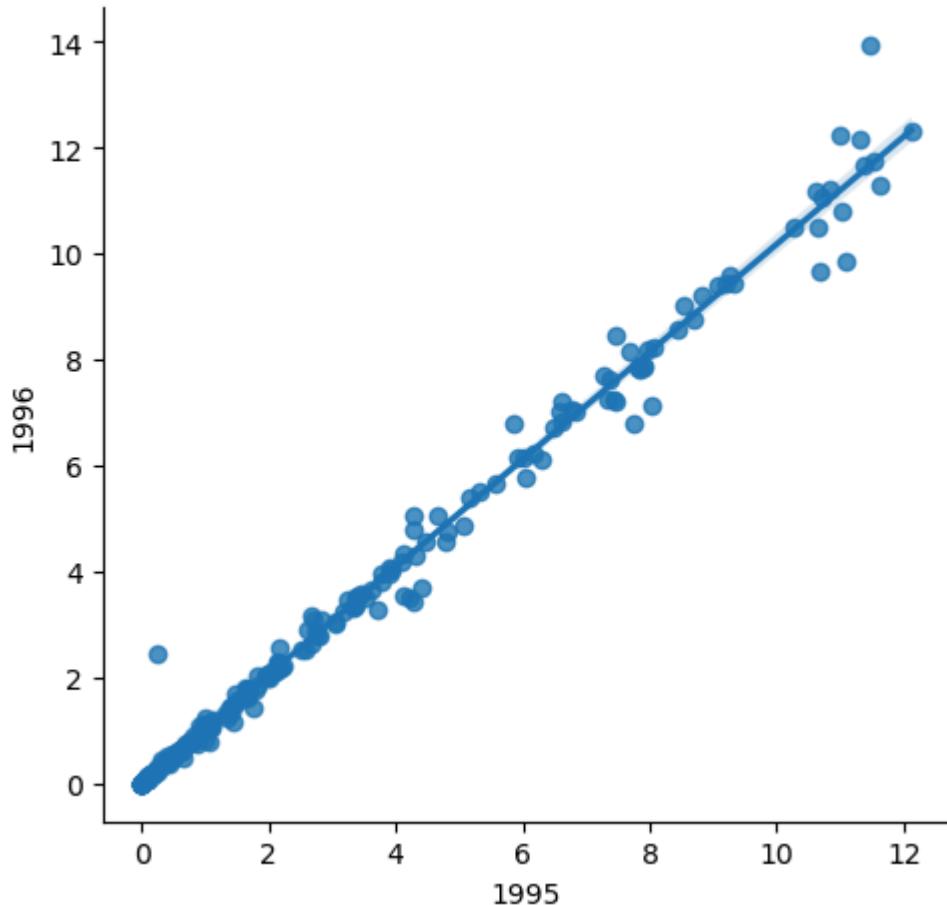
Scaterplot of 1994 vs 2019



Corelation between 1994 and 2019 : 0.8129989296694398

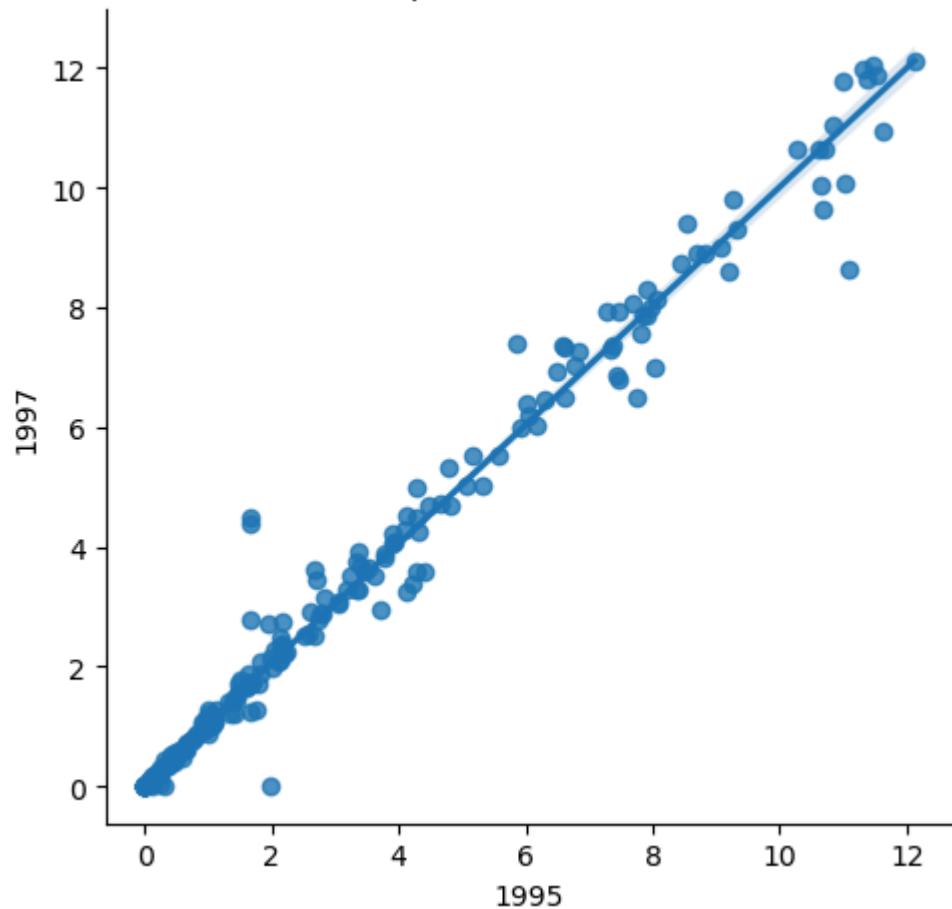
Corelation: Positively Corelated.

Scaterplot of 1995 vs 1996



Corelation between 1995 and 1996 : 0.9953420899223531

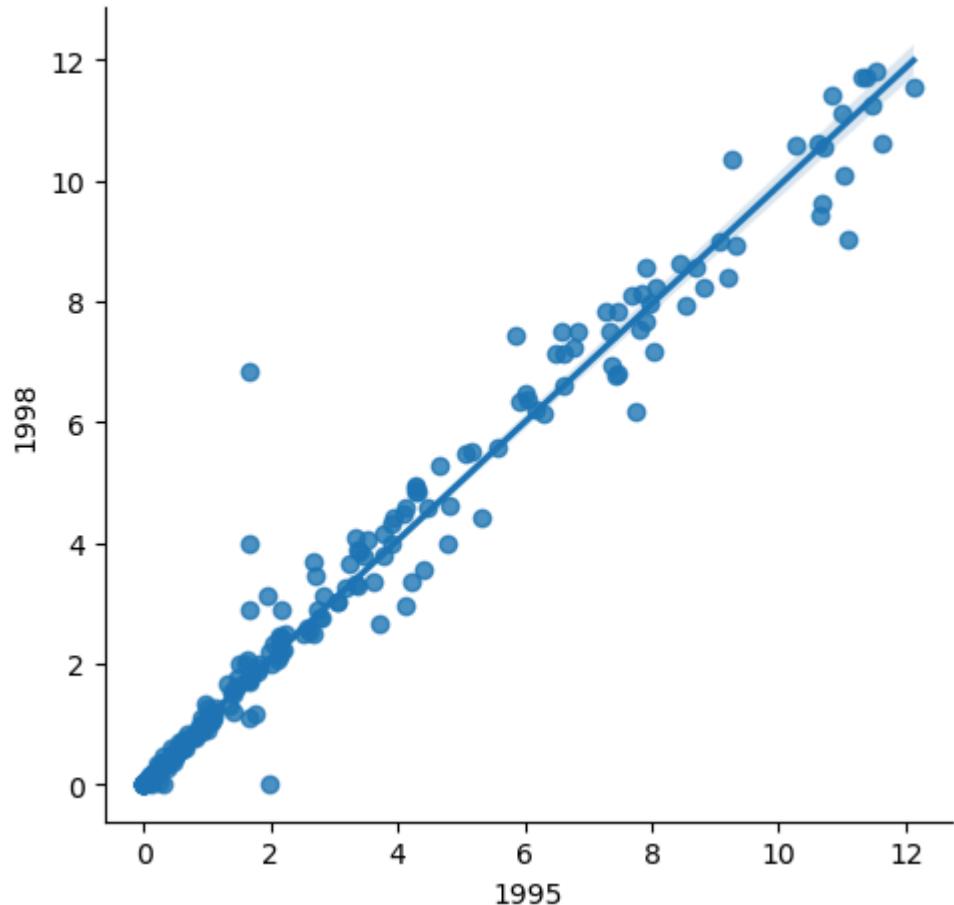
Corelation: Positively Corelated.

Scaterplot of 1995 vs 1997

Corelation between 1995 and 1997 : 0.9907152833701495

Corelation: Positively Corelated.

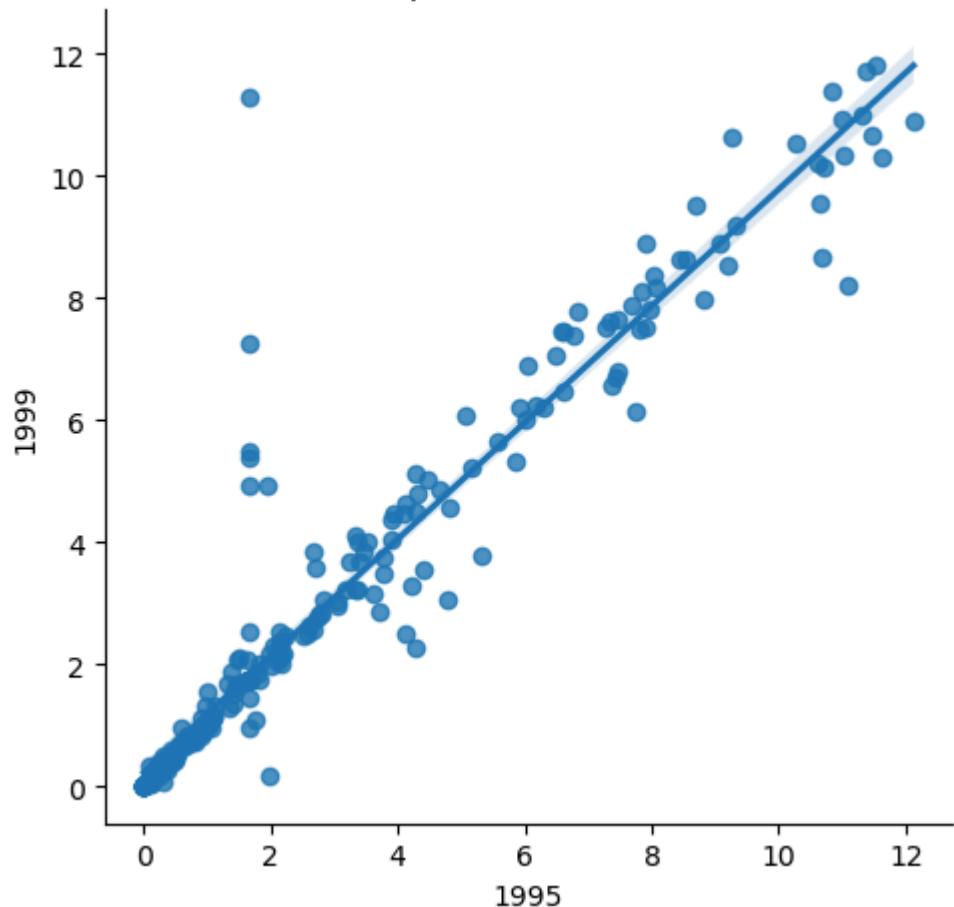
Scaterplot of 1995 vs 1998



Corelation between 1995 and 1998 : 0.9857254110229621

Corelation: Positively Corelated.

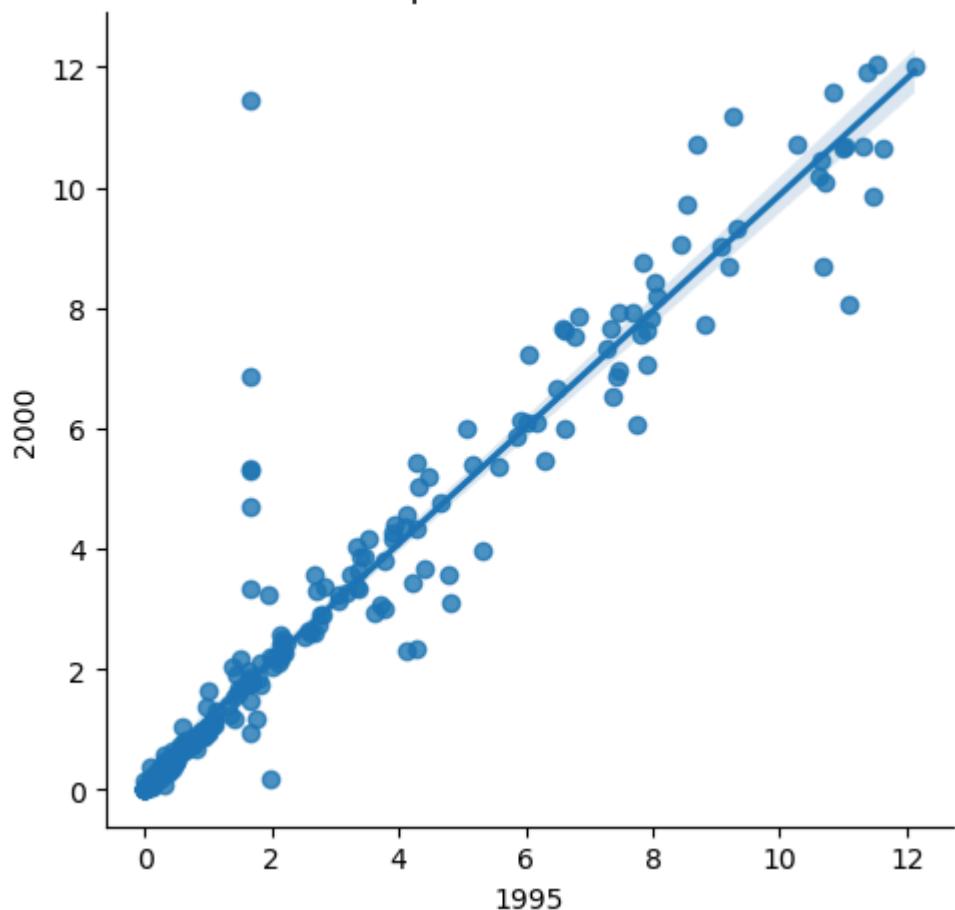
Scaterplot of 1995 vs 1999



Corelation between 1995 and 1999 : 0.9570135543320974

Corelation: Positively Corelated.

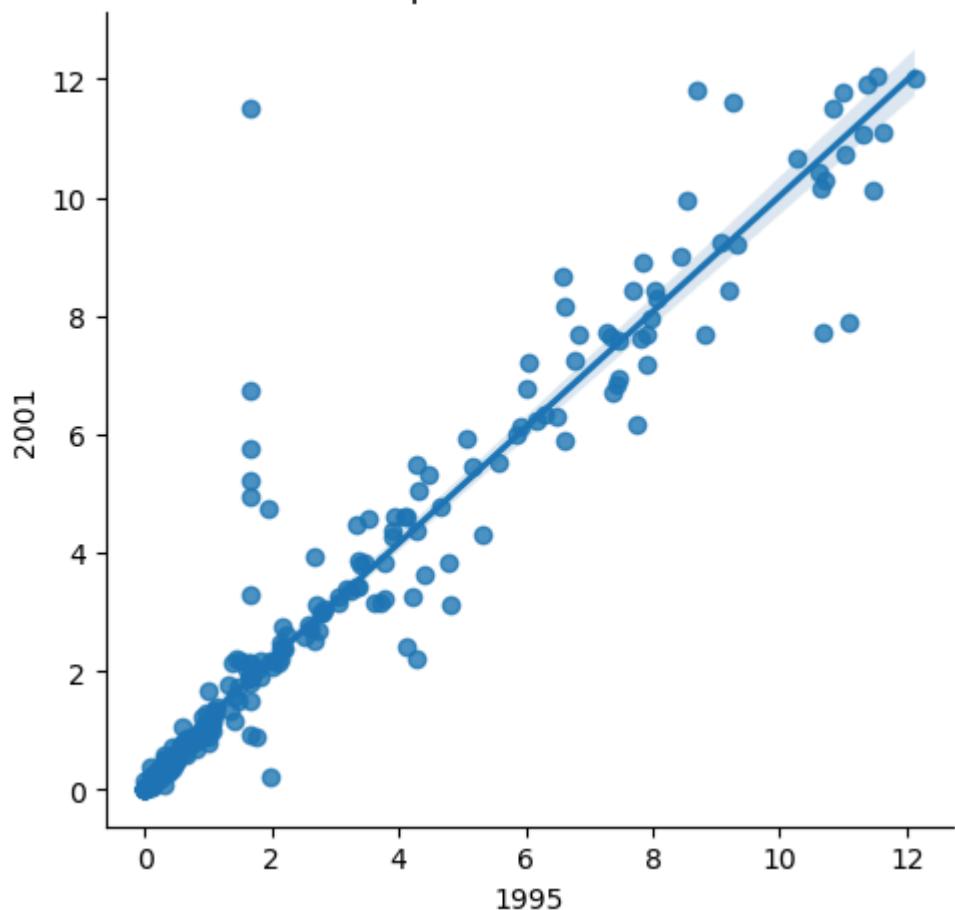
Scaterplot of 1995 vs 2000



Corelation between 1995 and 2000 : 0.9573385830407007

Corelation: Positively Corelated.

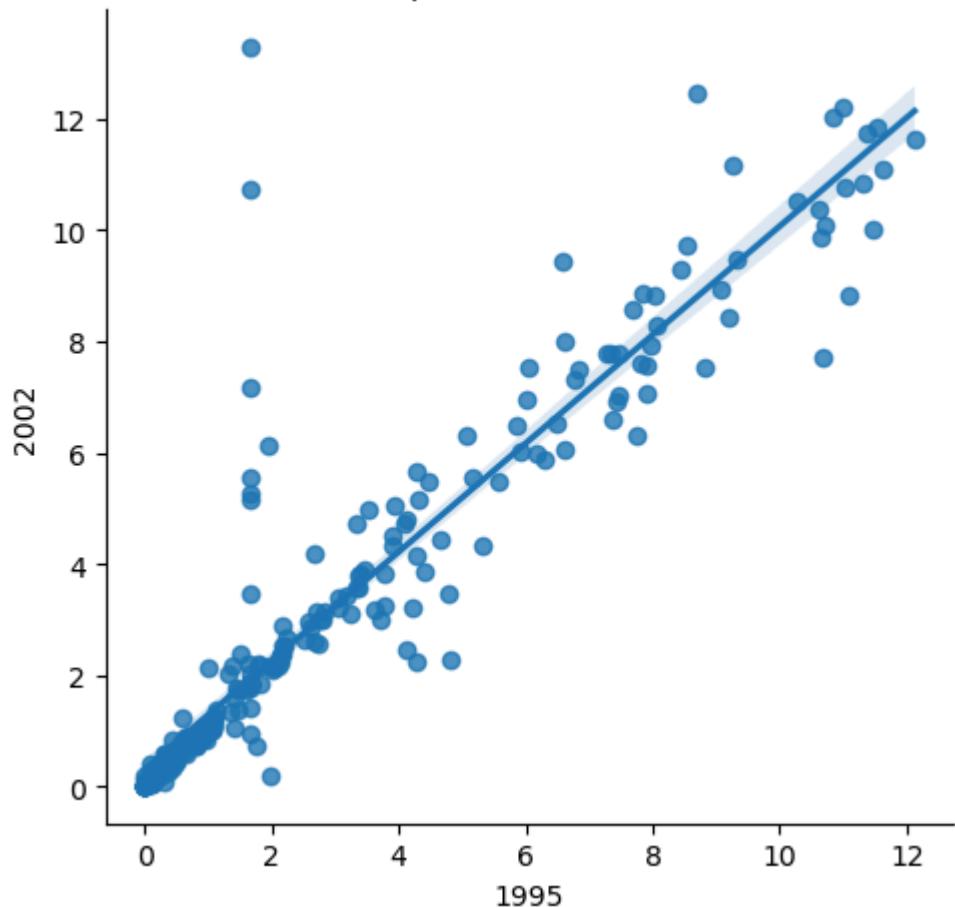
Scaterplot of 1995 vs 2001



Corelation between 1995 and 2001 : 0.9536298671591662

Corelation: Positively Corelated.

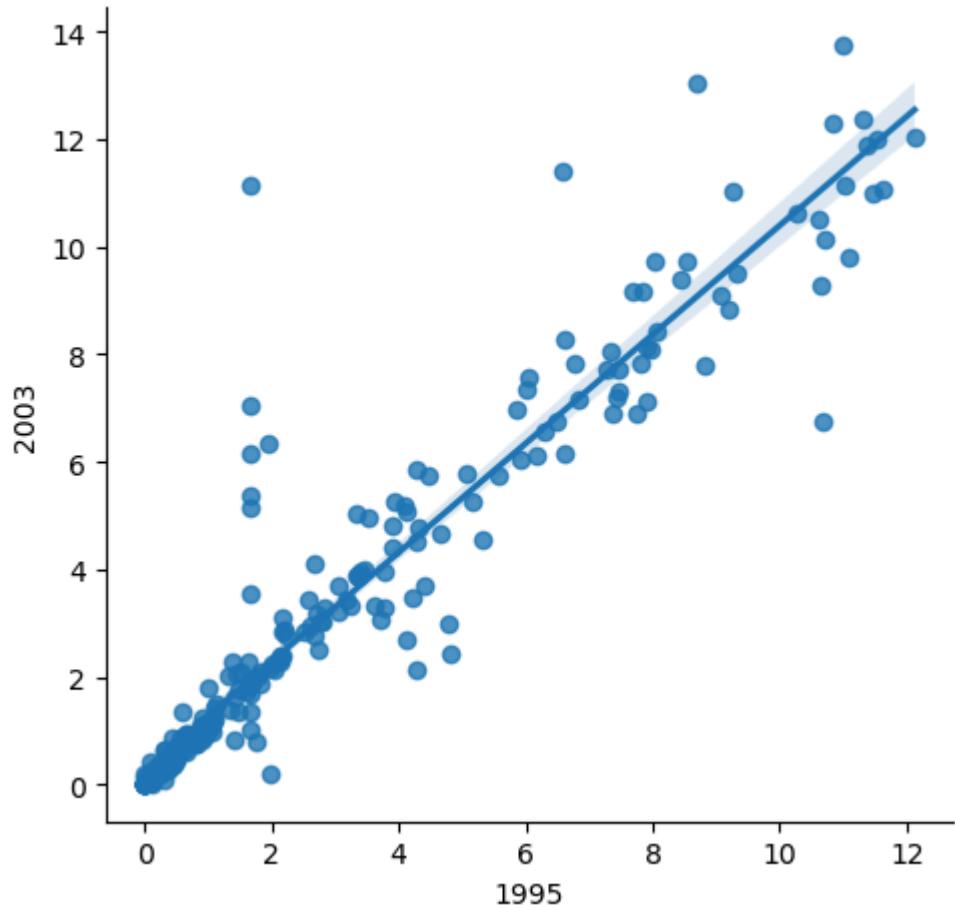
Scaterplot of 1995 vs 2002



Corelation between 1995 and 2002 : 0.9298372419403891

Corelation: Positively Corelated.

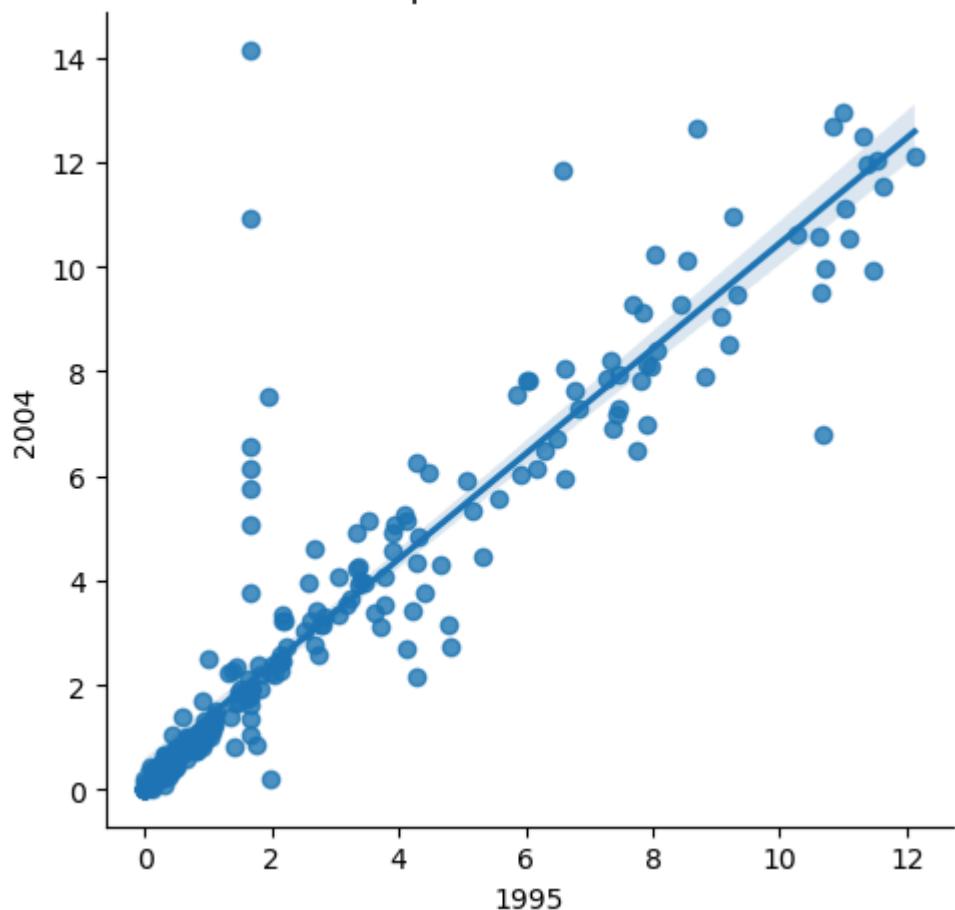
Scaterplot of 1995 vs 2003



Corelation between 1995 and 2003 : 0.9477541590794201

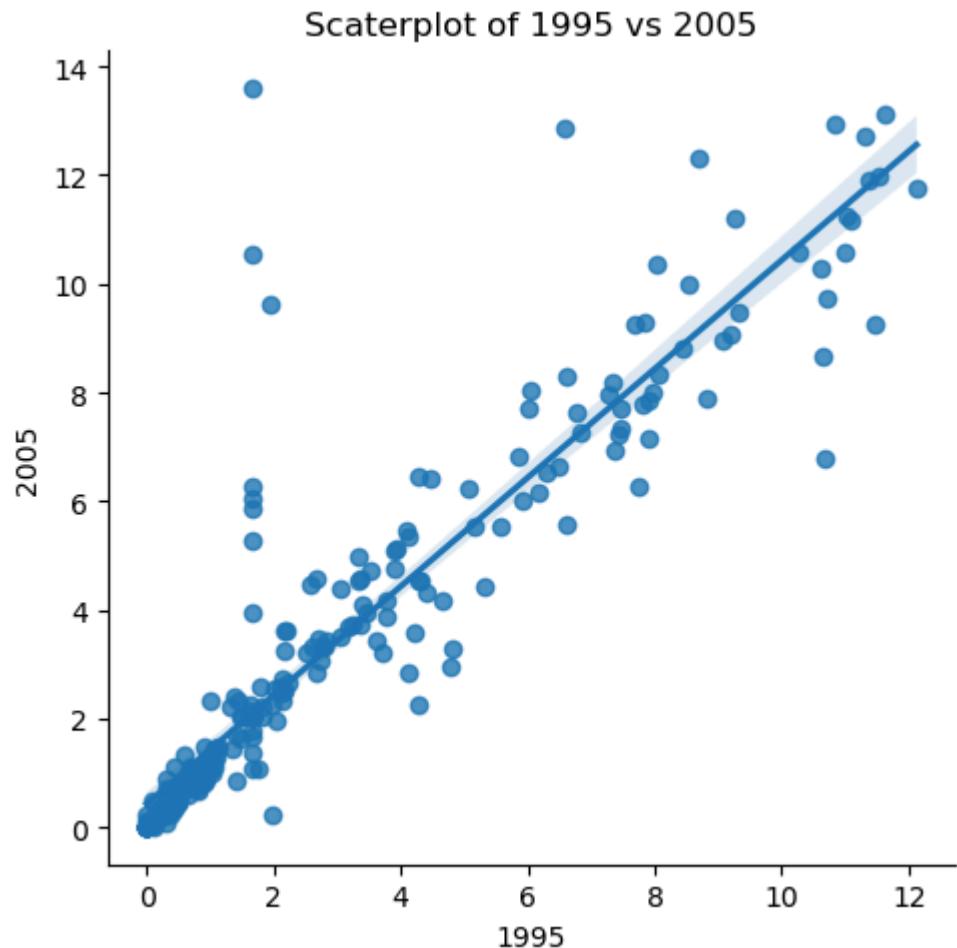
Corelation: Positively Corelated.

Scaterplot of 1995 vs 2004



Corelation between 1995 and 2004 : 0.9226901969160767

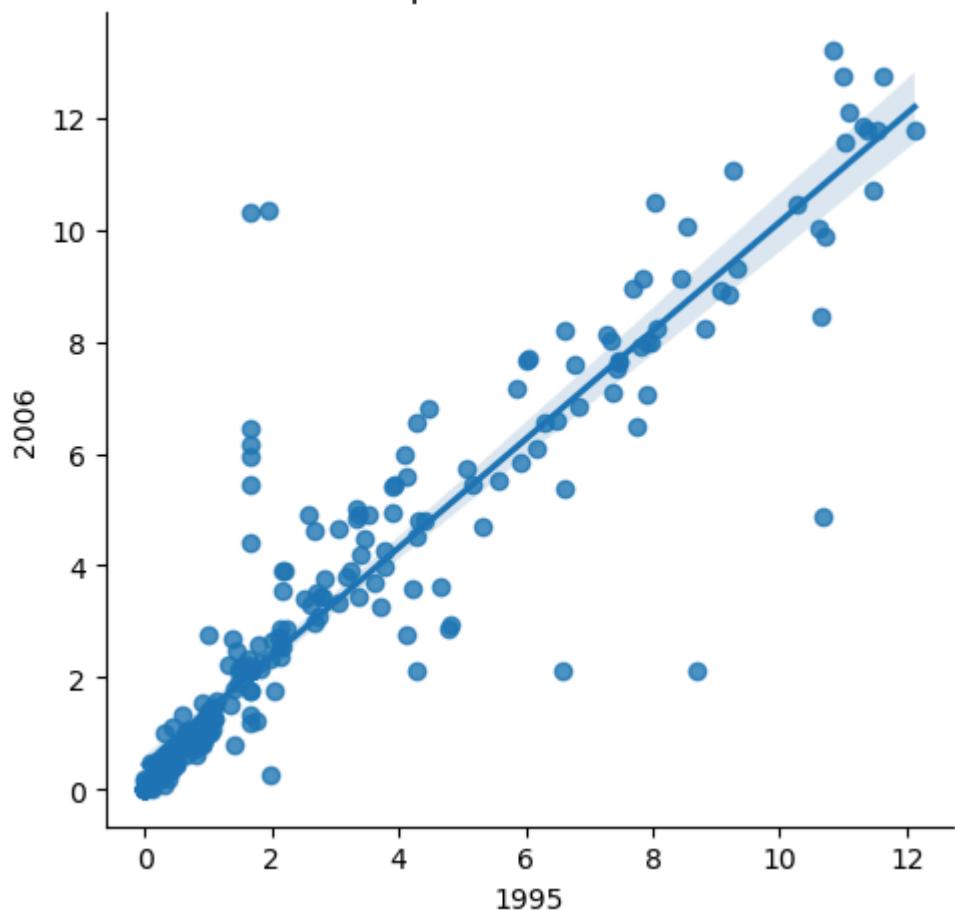
Corelation: Positively Corelated.



Corelation between 1995 and 2005 : 0.9183553704081383

Corelation: Positively Corelated.

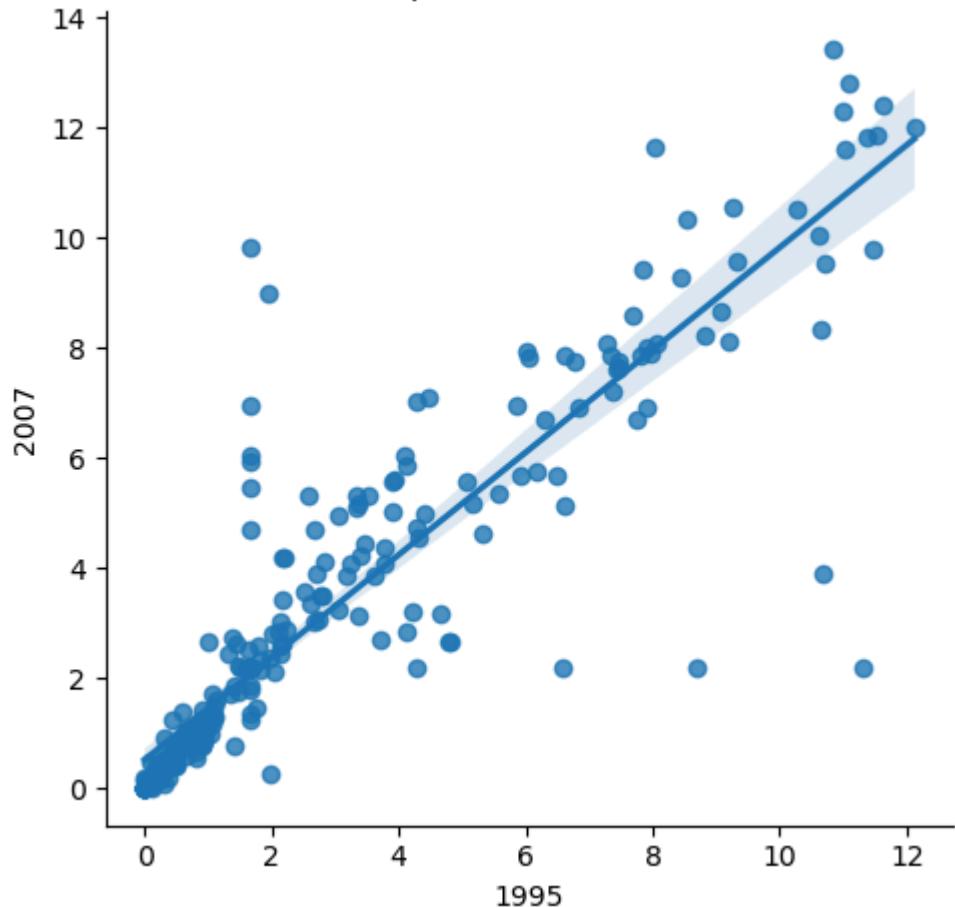
Scaterplot of 1995 vs 2006



Corelation between 1995 and 2006 : 0.9237804246868273

Corelation: Positively Corelated.

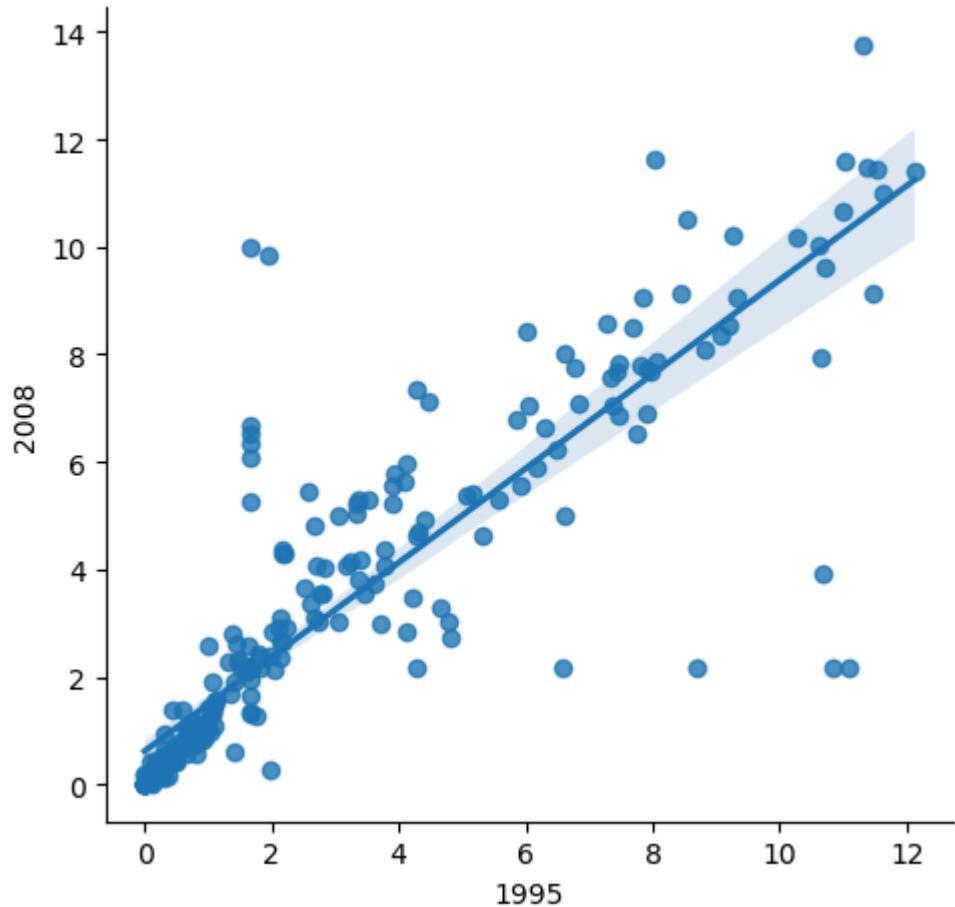
Scaterplot of 1995 vs 2007



Corelation between 1995 and 2007 : 0.9012751887630706

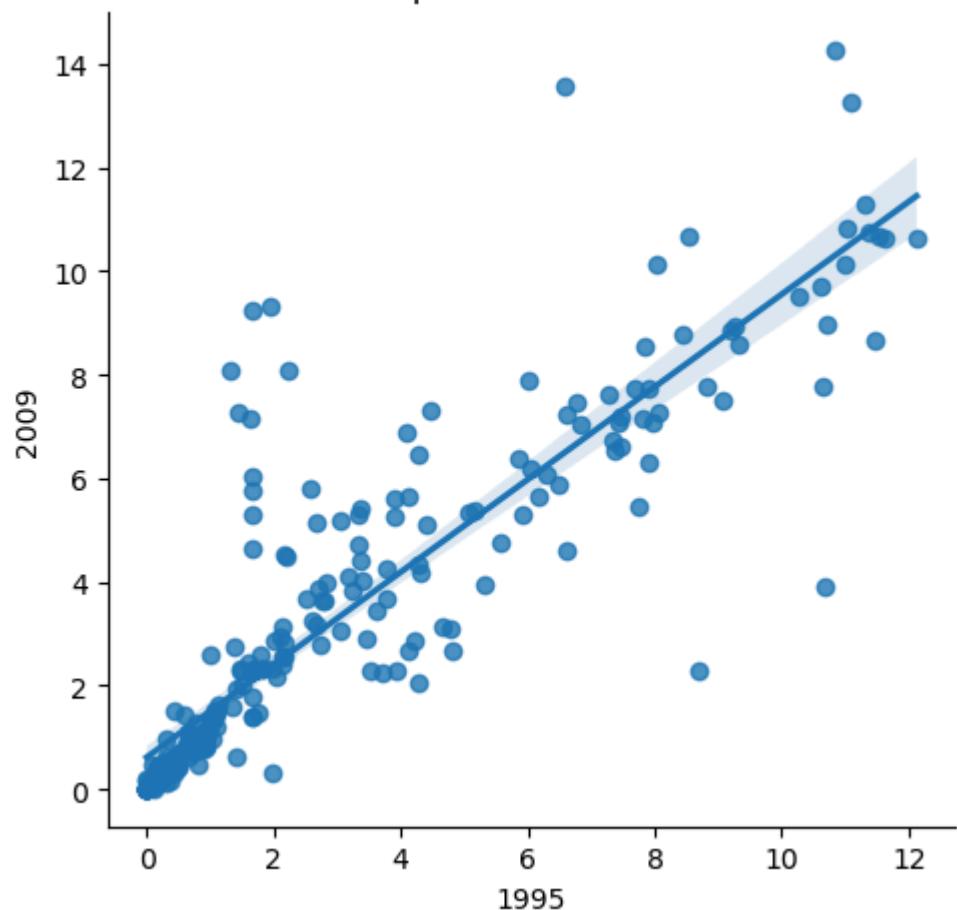
Corelation: Positively Corelated.

Scaterplot of 1995 vs 2008



Corelation between 1995 and 2008 : 0.8769249389570427

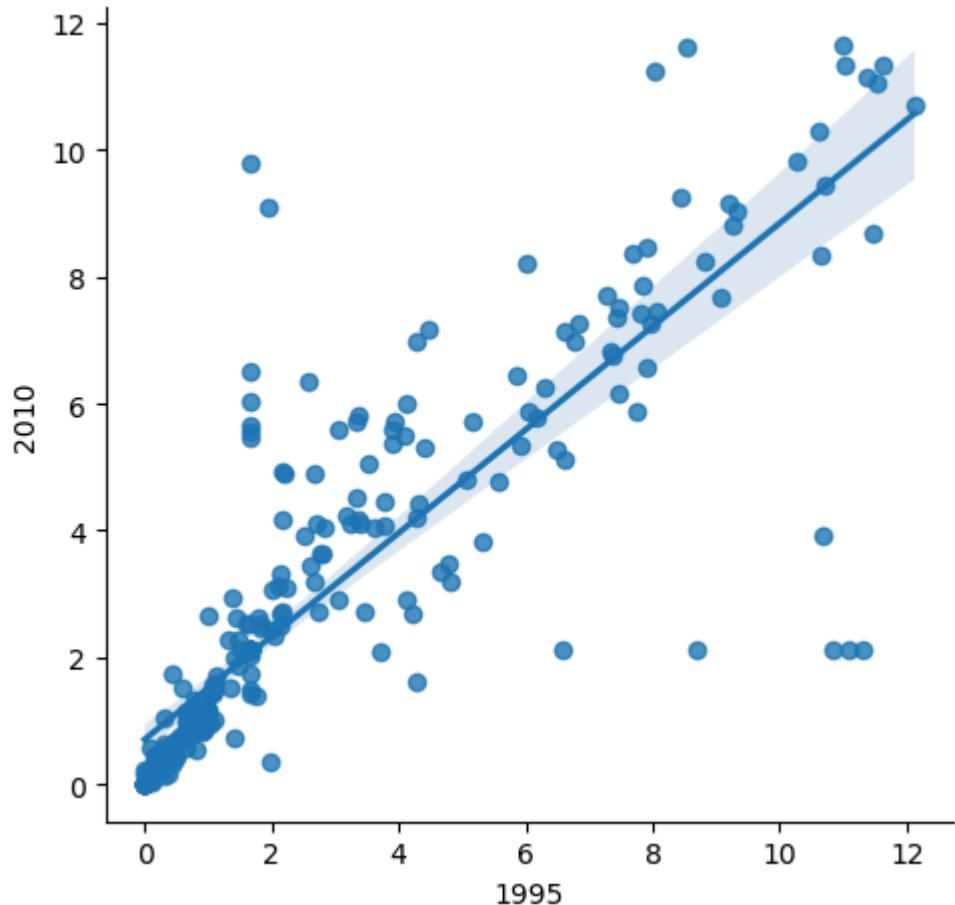
Corelation: Positively Corelated.

Scaterplot of 1995 vs 2009

Corelation between 1995 and 2009 : 0.884286047372143

Corelation: Positively Corelated.

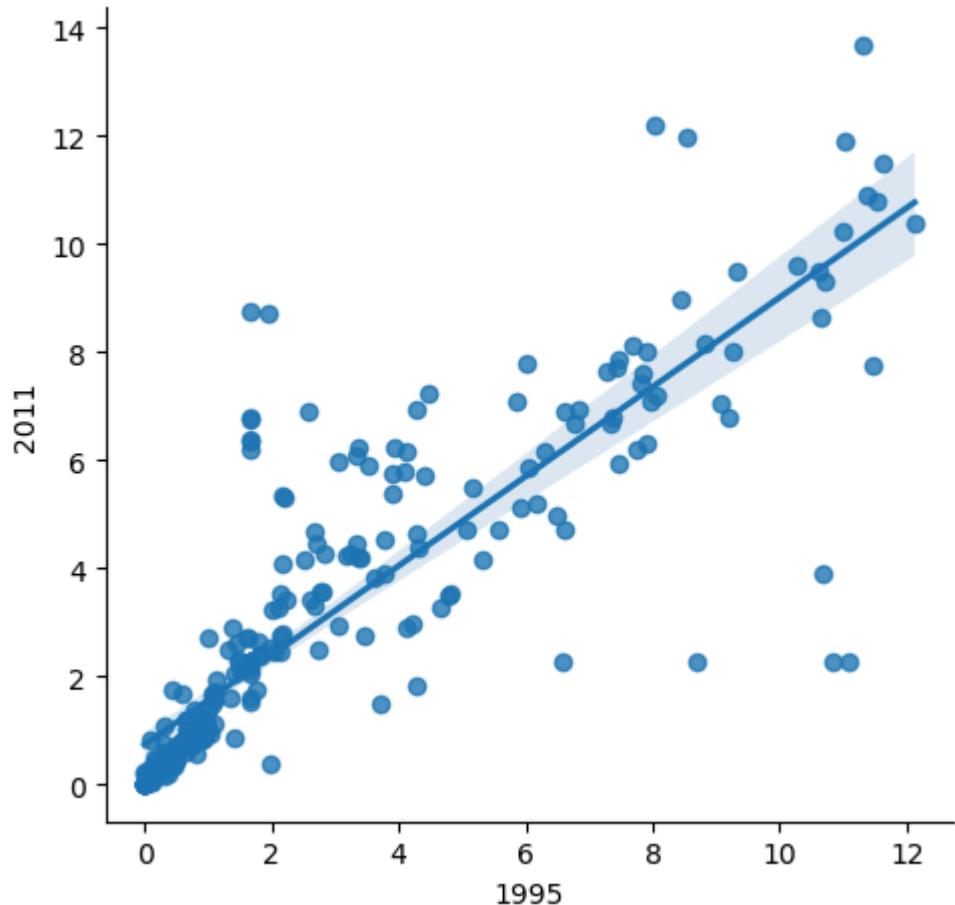
Scaterplot of 1995 vs 2010



Corelation between 1995 and 2010 : 0.8536962594556896

Corelation: Positively Corelated.

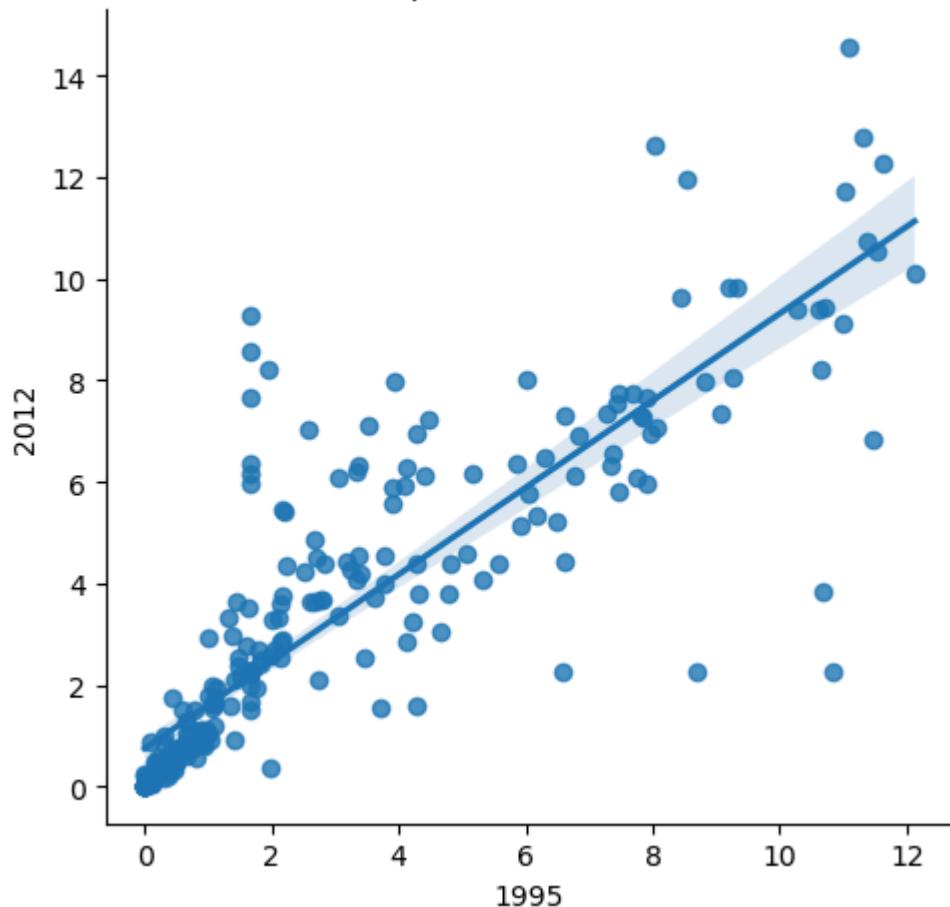
Scaterplot of 1995 vs 2011



Corelation between 1995 and 2011 : 0.8596019225283035

Corelation: Positively Corelated.

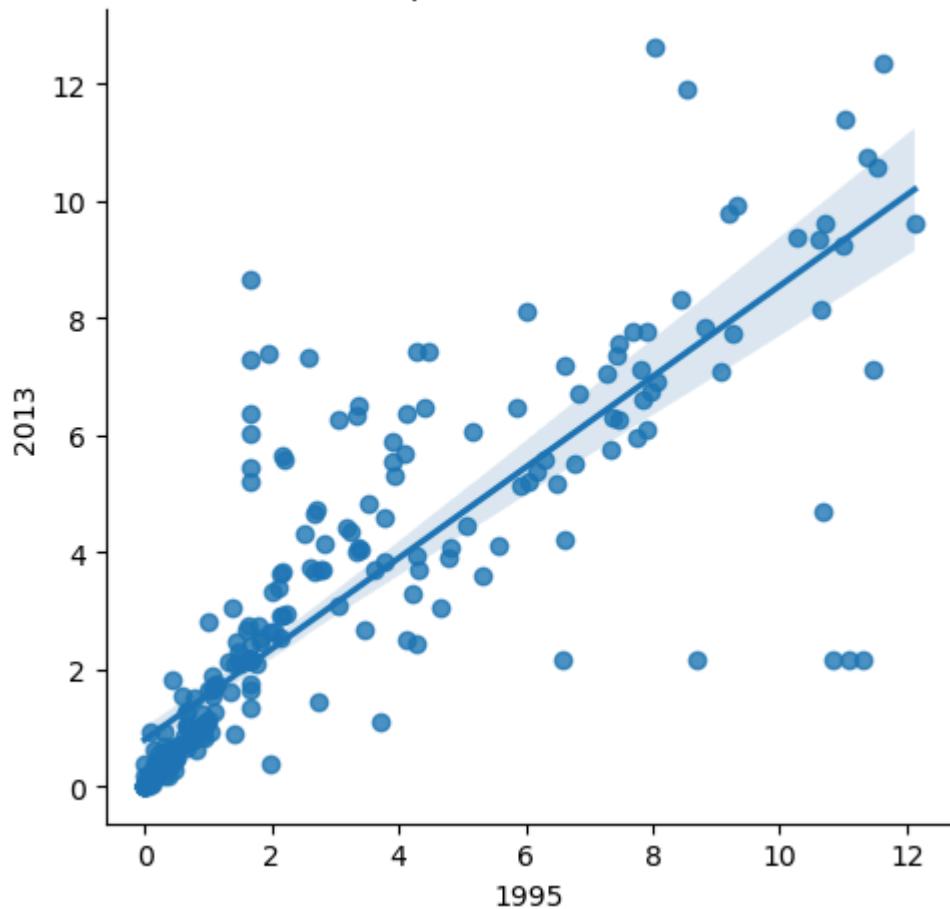
Scaterplot of 1995 vs 2012



Corelation between 1995 and 2012 : 0.8616951461045934

Corelation: Positively Corelated.

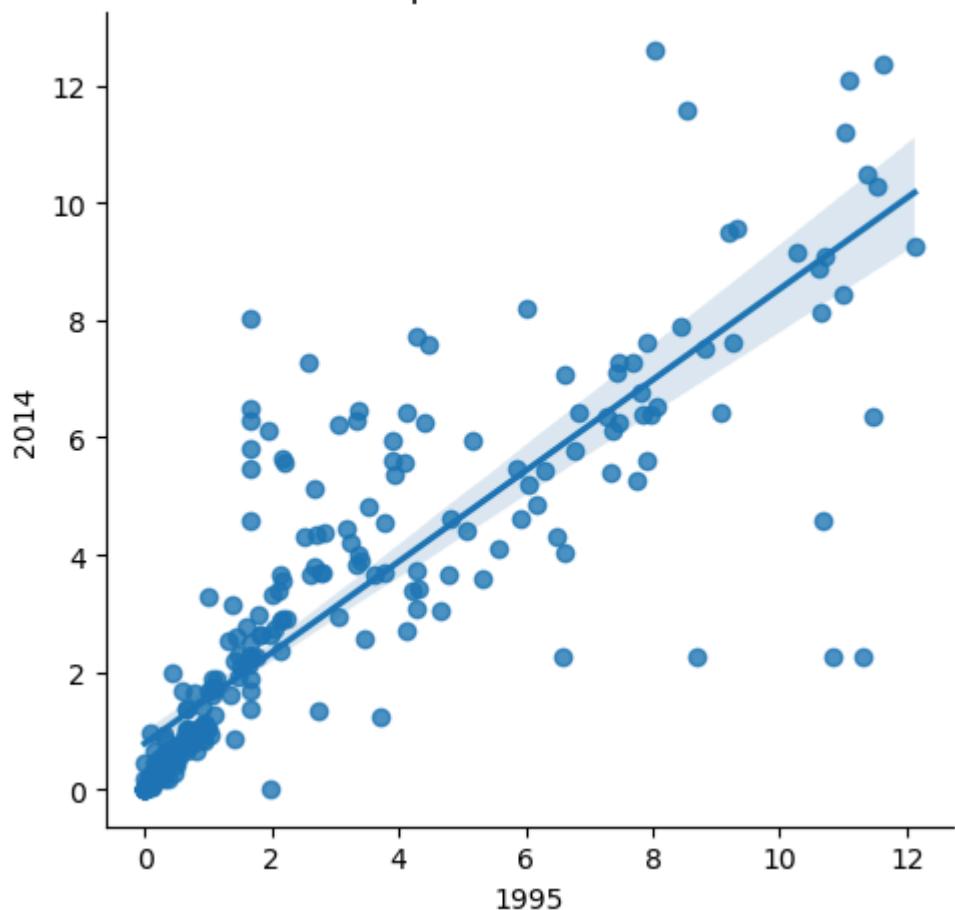
Scaterplot of 1995 vs 2013



Corelation between 1995 and 2013 : 0.8381847226651726

Corelation: Positively Corelated.

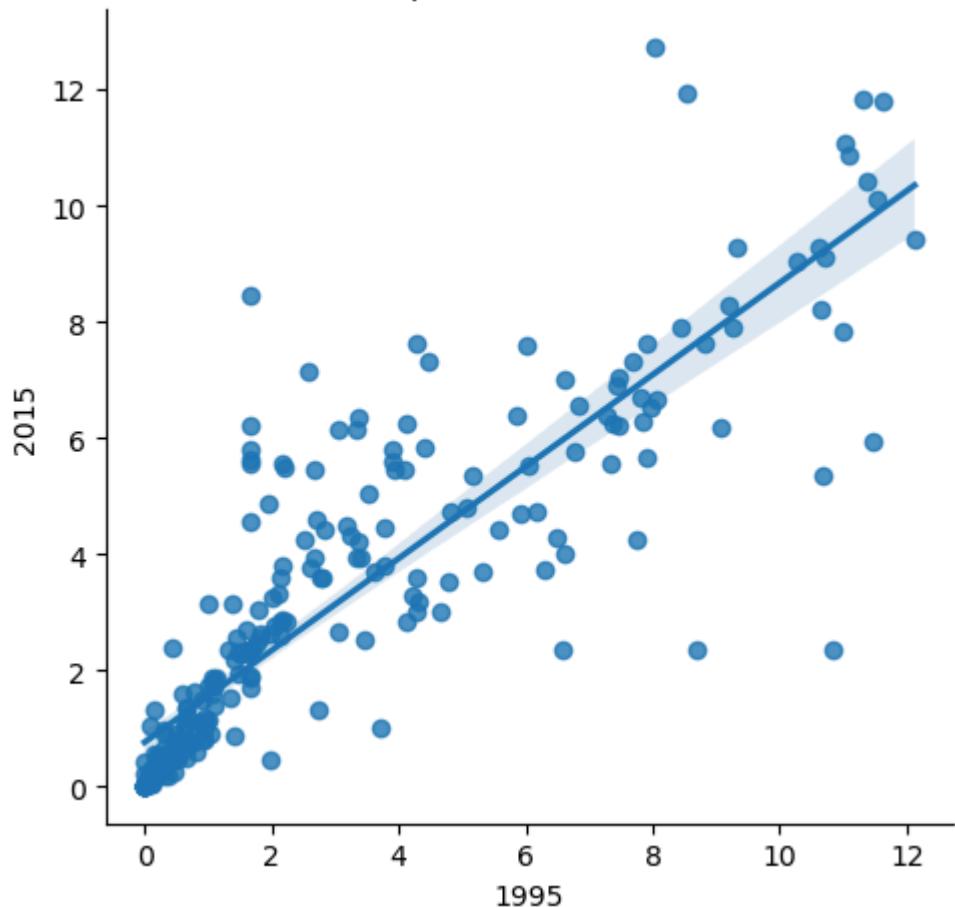
Scaterplot of 1995 vs 2014



Corelation between 1995 and 2014 : 0.8517370369019052

Corelation: Positively Corelated.

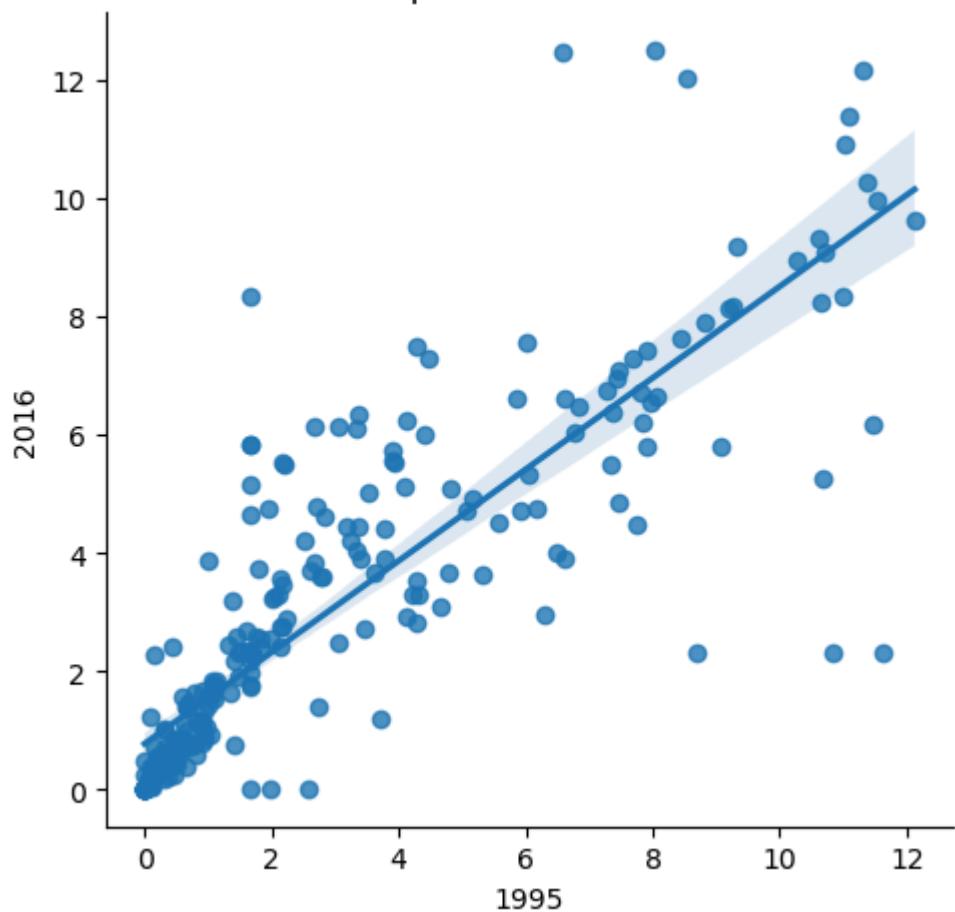
Scaterplot of 1995 vs 2015



Corelation between 1995 and 2015 : 0.870238526160137

Corelation: Positively Corelated.

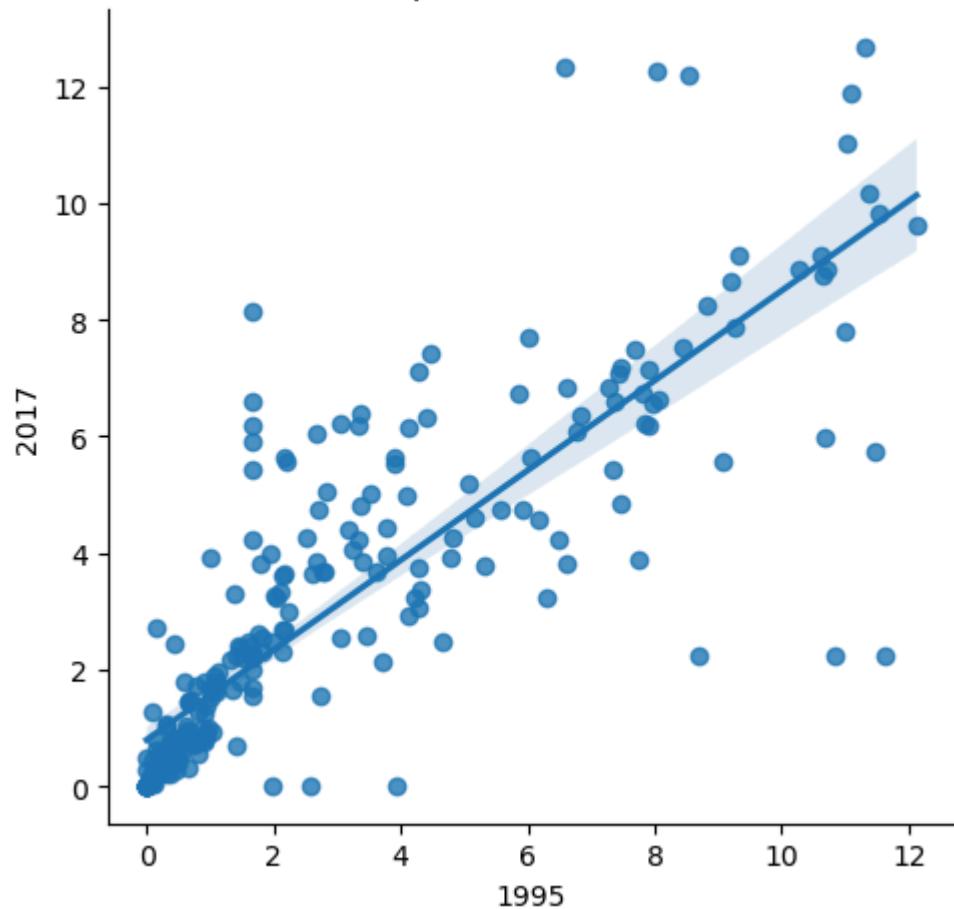
Scaterplot of 1995 vs 2016



Corelation between 1995 and 2016 : 0.8518393059581993

Corelation: Positively Corelated.

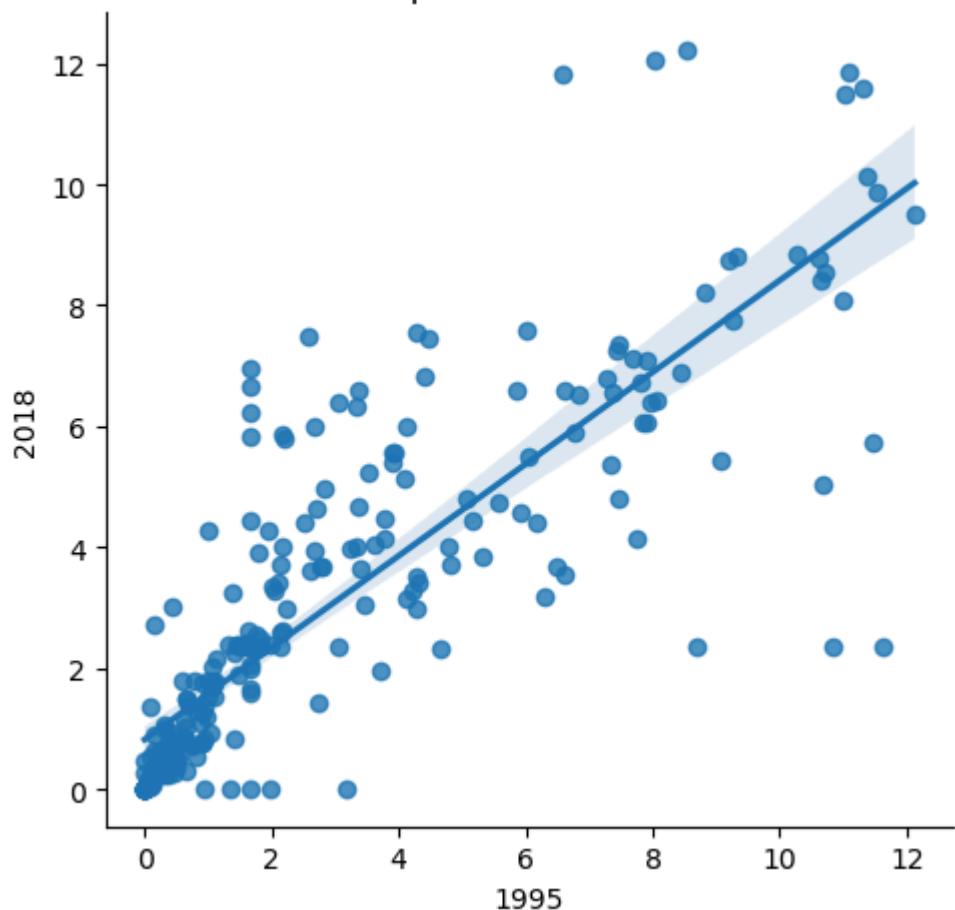
Scaterplot of 1995 vs 2017



Corelation between 1995 and 2017 : 0.8438066524259049

Corelation: Positively Corelated.

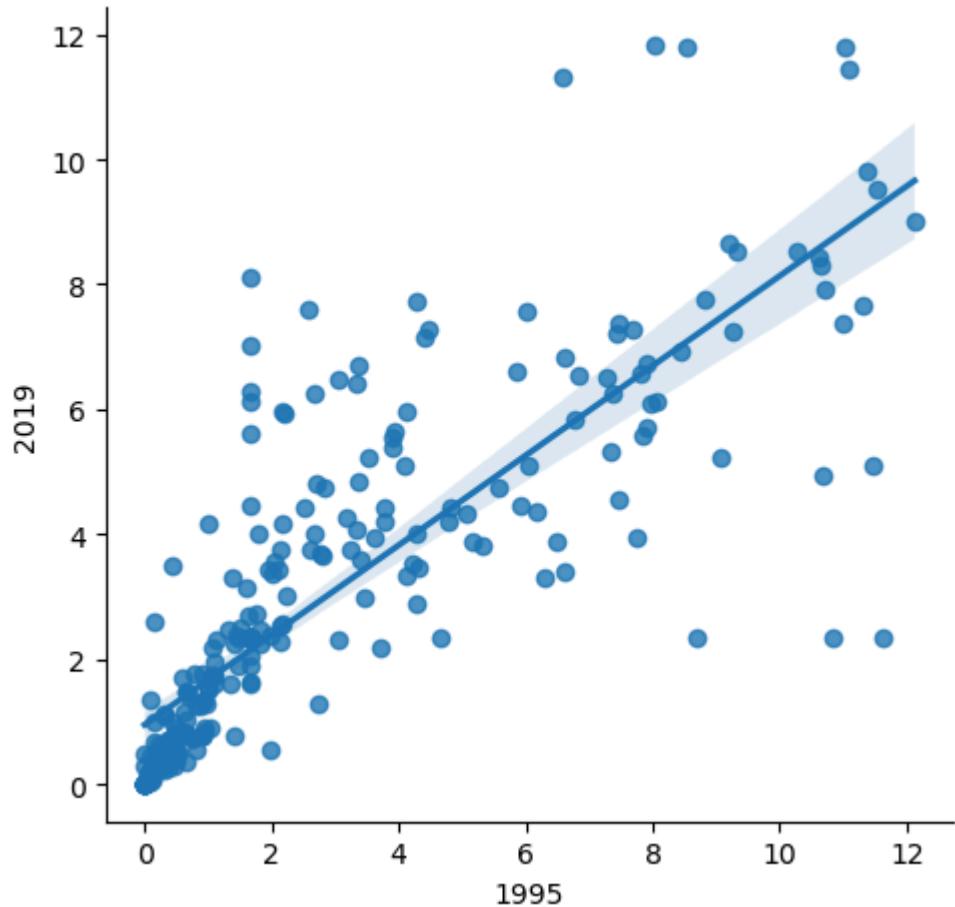
Scaterplot of 1995 vs 2018



Corelation between 1995 and 2018 : 0.8385805688474475

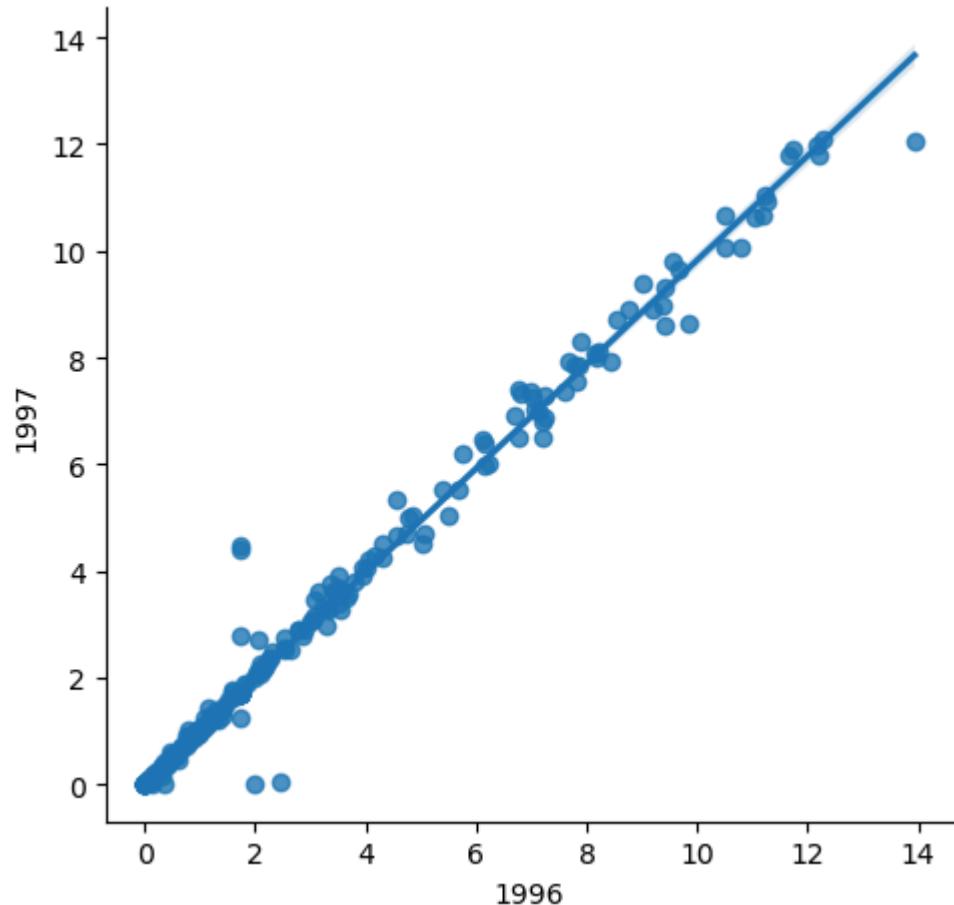
Corelation: Positively Corelated.

Scaterplot of 1995 vs 2019



Corelation between 1995 and 2019 : 0.8213406242509048

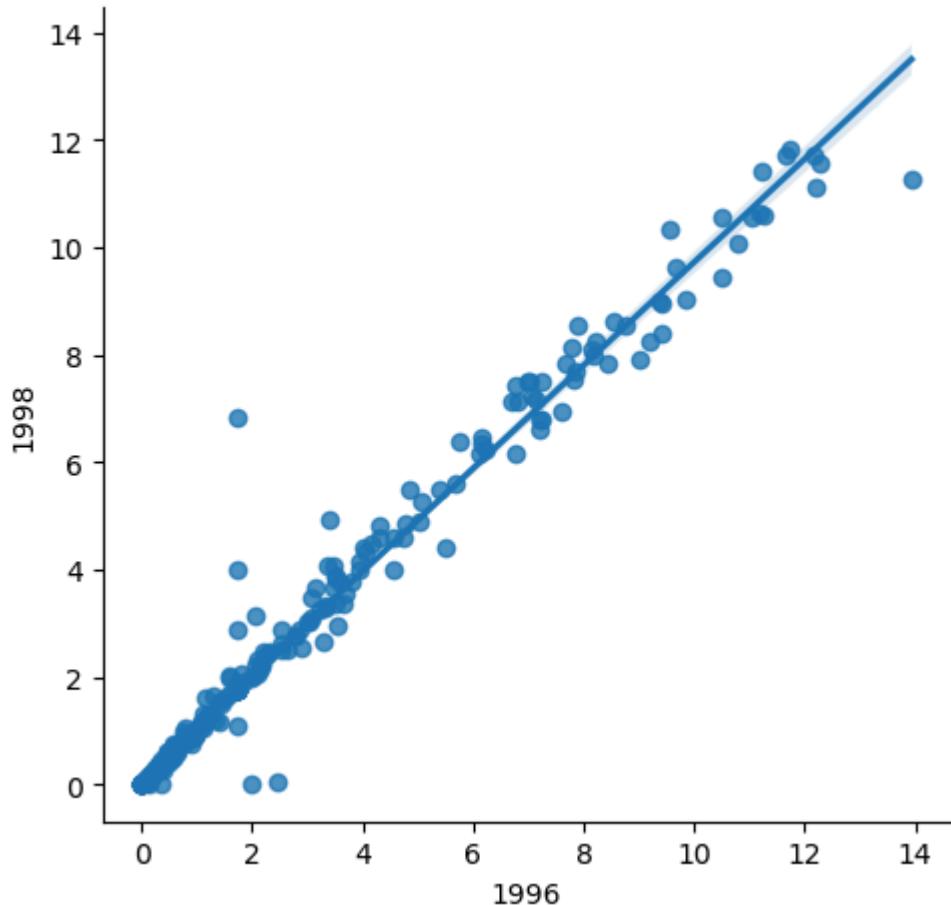
Corelation: Positively Corelated.

Scaterplot of 1996 vs 1997

Corelation between 1996 and 1997 : 0.9929297161110969

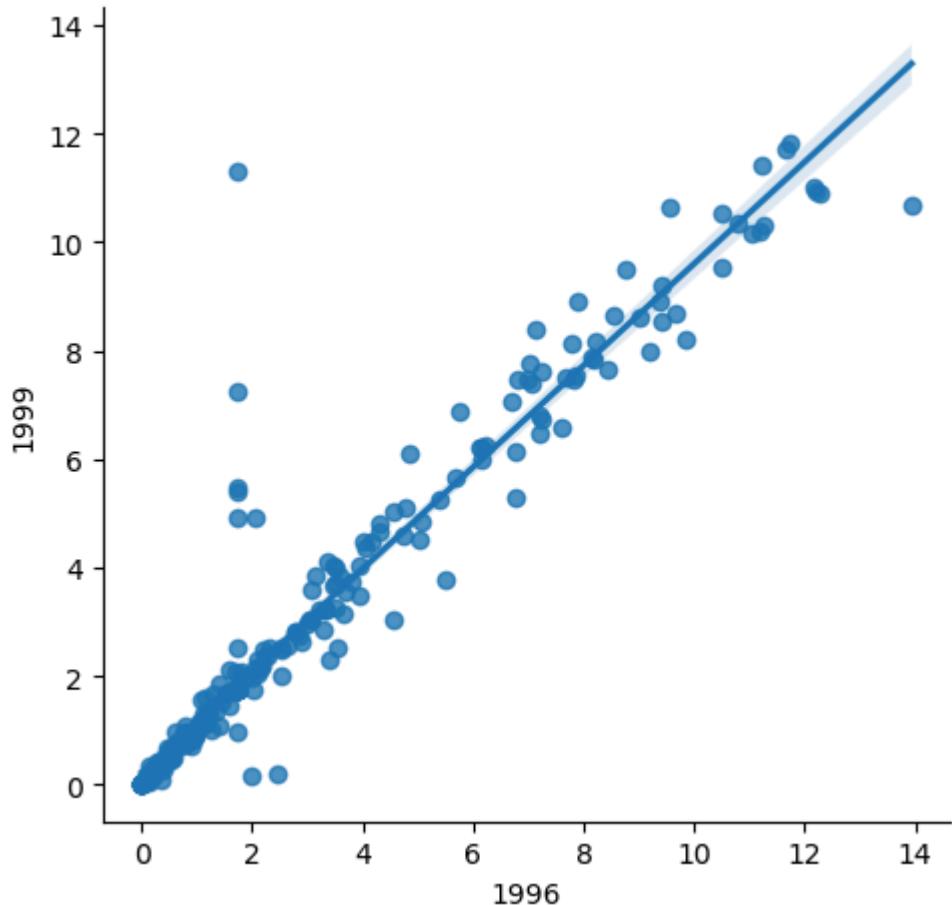
Corelation: Positively Corelated.

Scaterplot of 1996 vs 1998



Corelation between 1996 and 1998 : 0.986844792686015

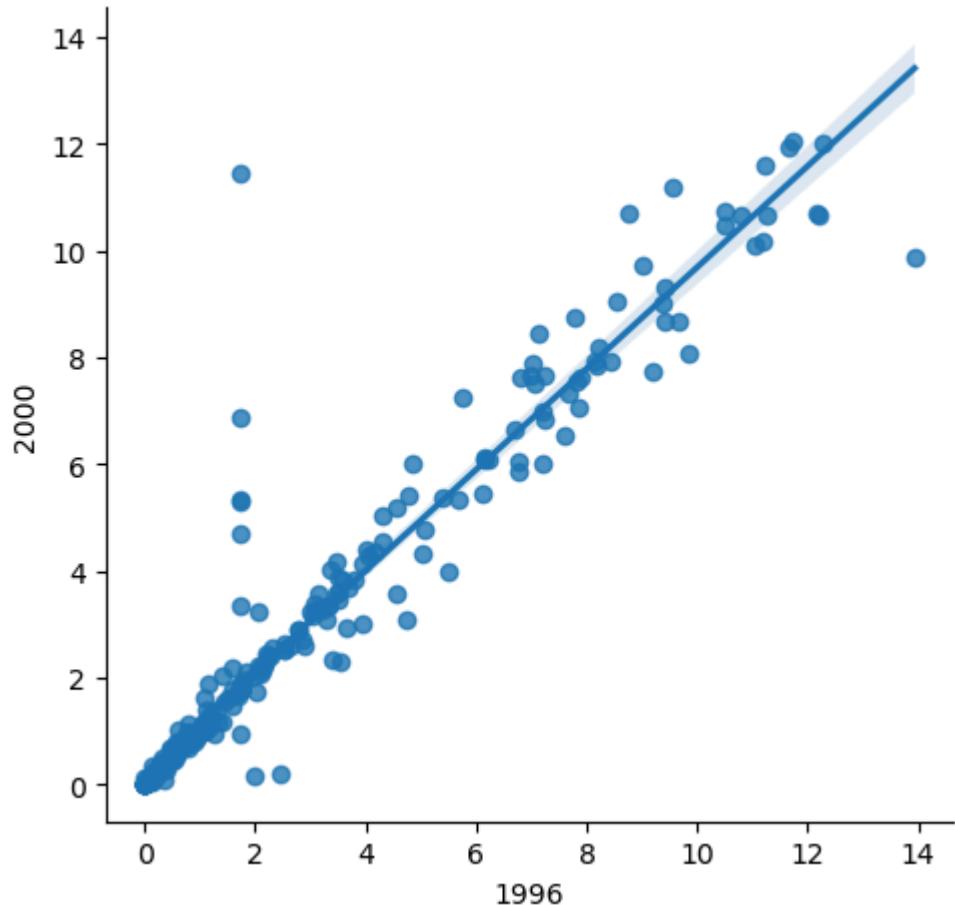
Corelation: Positively Corelated.

Scaterplot of 1996 vs 1999

Corelation between 1996 and 1999 : 0.9583254536038158

Corelation: Positively Corelated.

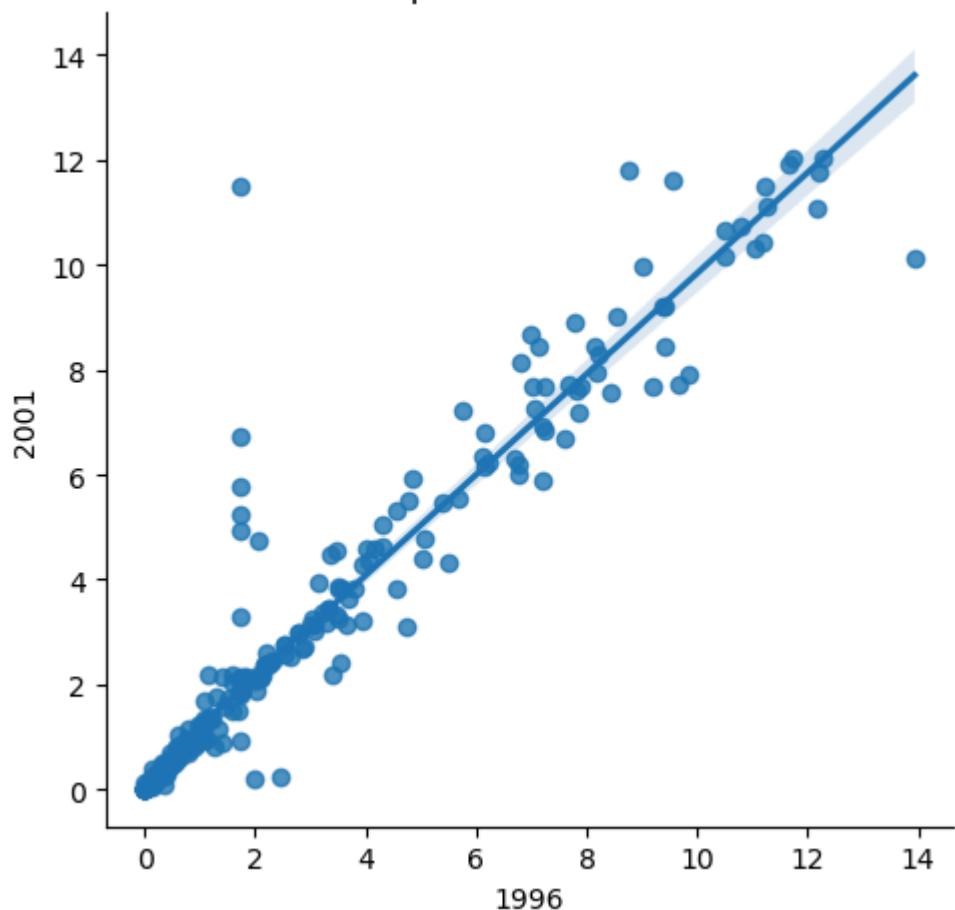
Scaterplot of 1996 vs 2000



Corelation between 1996 and 2000 : 0.957701170138014

Corelation: Positively Corelated.

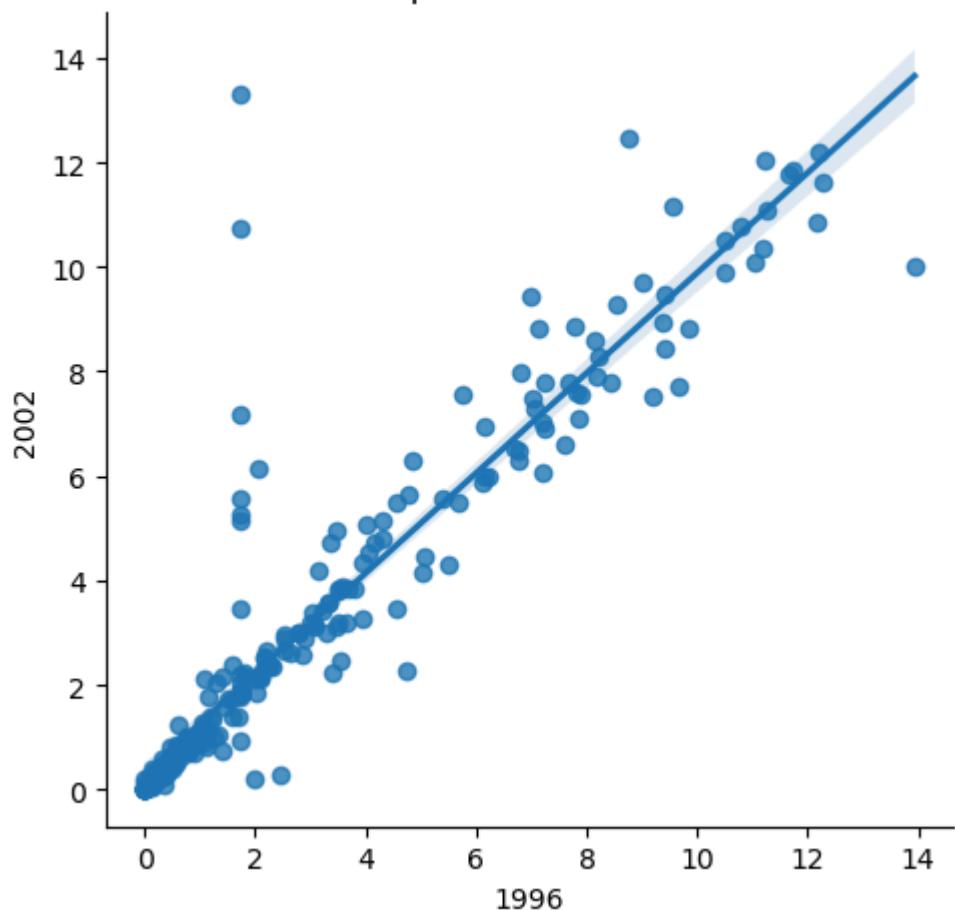
Scaterplot of 1996 vs 2001



Corelation between 1996 and 2001 : 0.9552408207755326

Corelation: Positively Corelated.

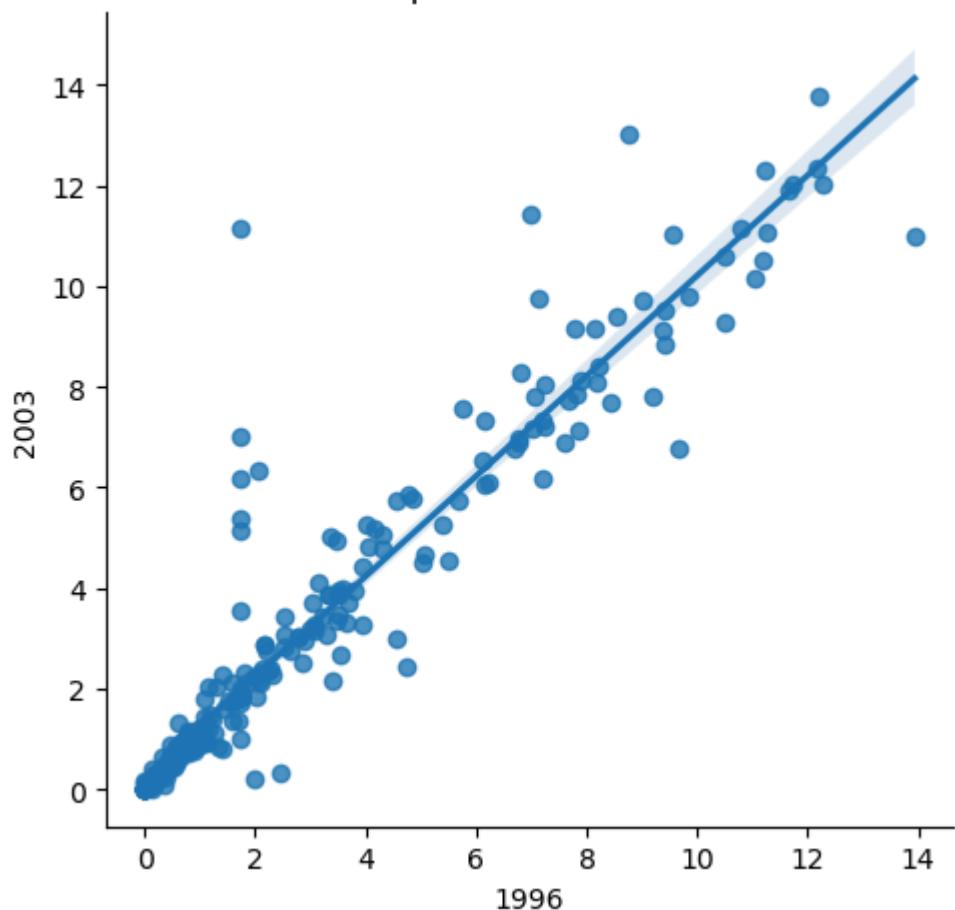
Scaterplot of 1996 vs 2002



Corelation between 1996 and 2002 : 0.9312975080869833

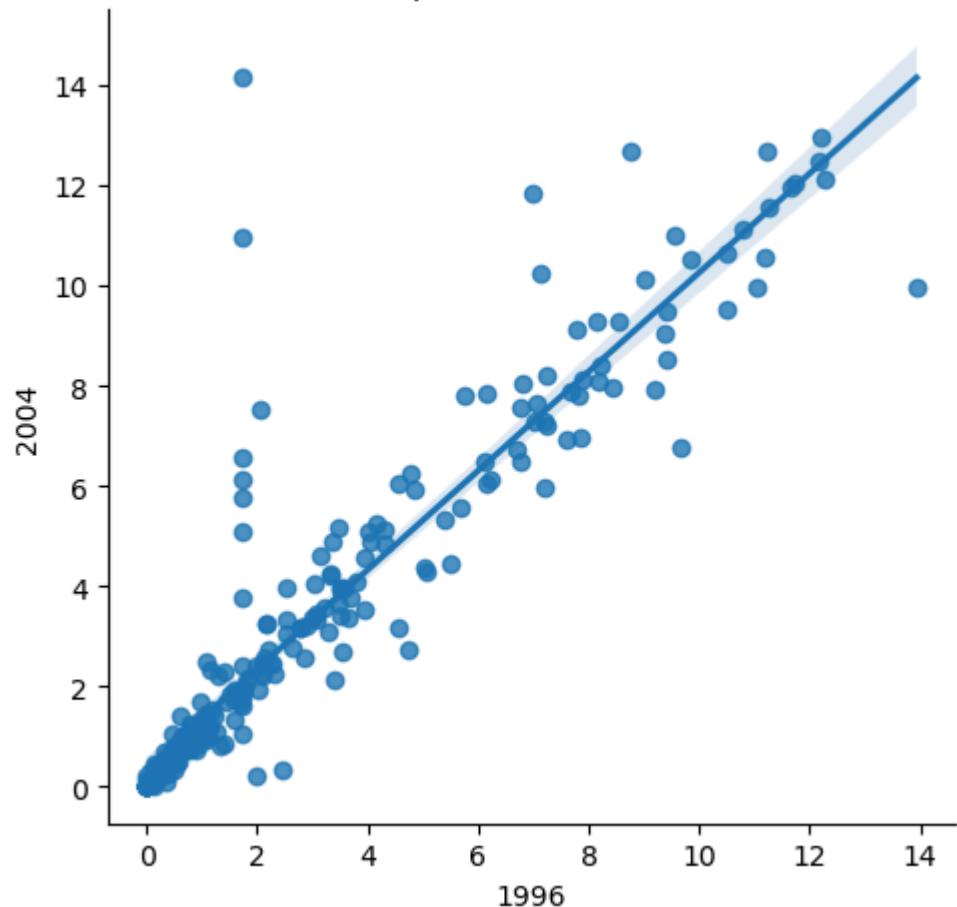
Corelation: Positively Corelated.

Scaterplot of 1996 vs 2003



Corelation between 1996 and 2003 : 0.9502203865305651

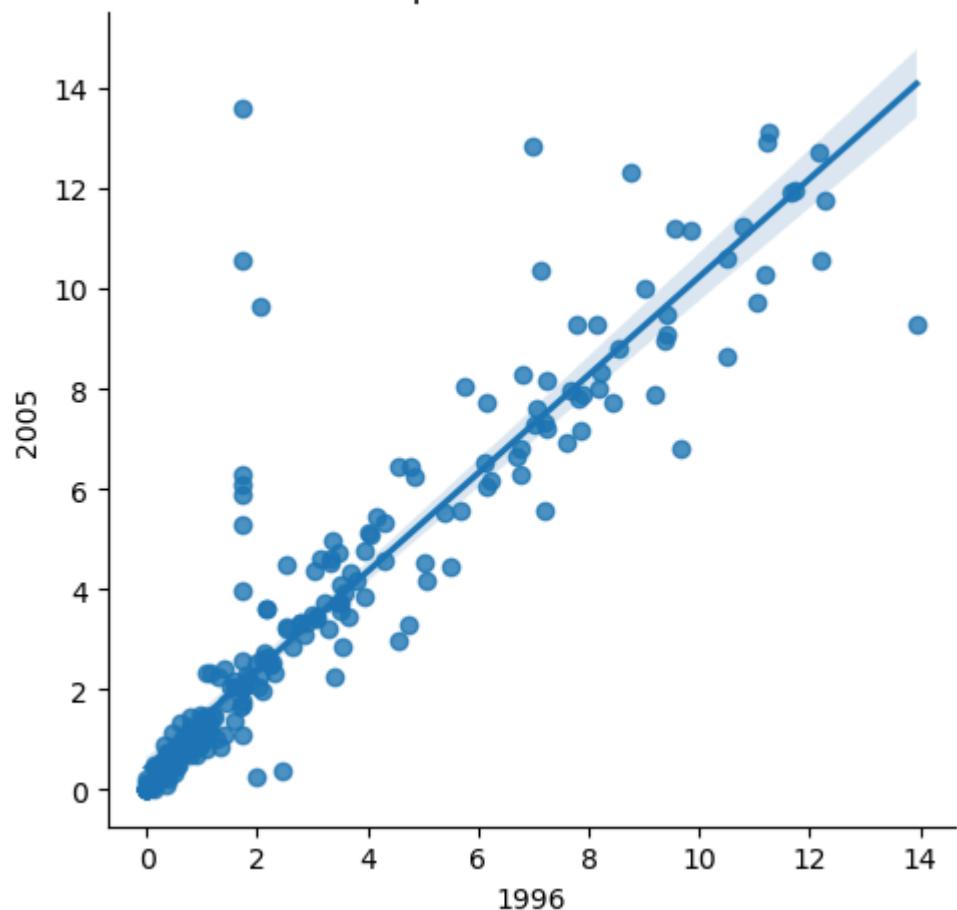
Corelation: Positively Corelated.

Scaterplot of 1996 vs 2004

Corelation between 1996 and 2004 : 0.9241282775922269

Corelation: Positively Corelated.

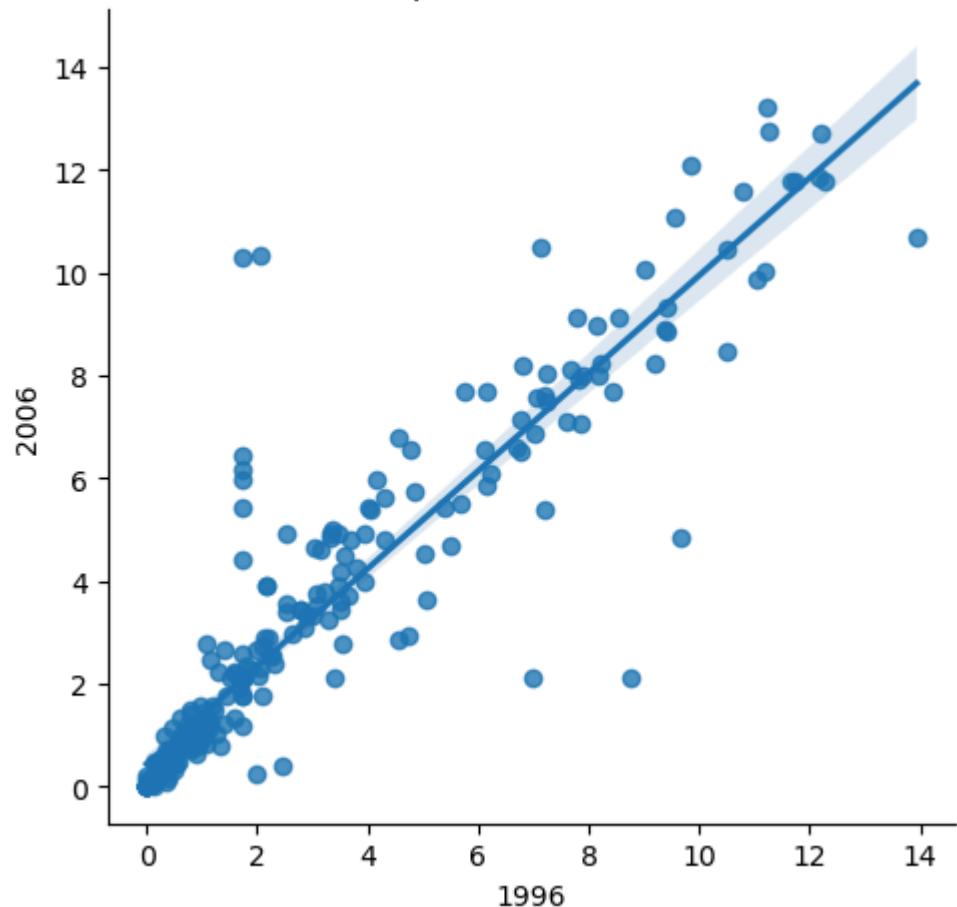
Scaterplot of 1996 vs 2005



Corelation between 1996 and 2005 : 0.9174914648454552

Corelation: Positively Corelated.

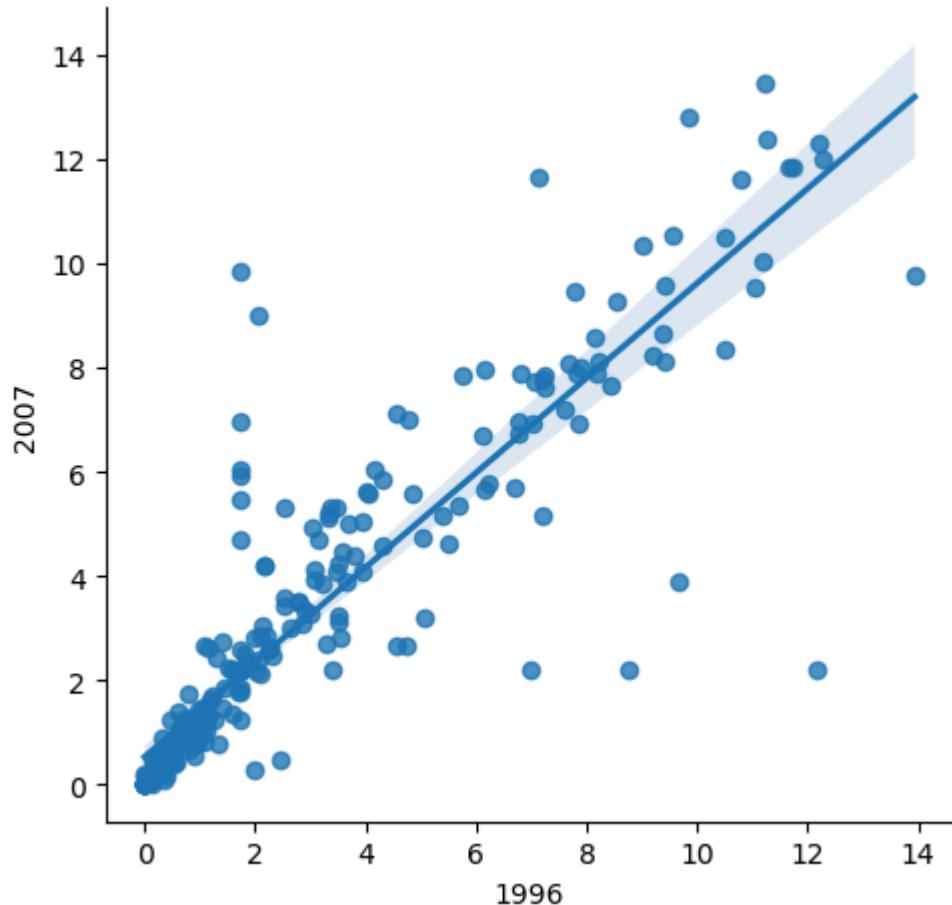
Scaterplot of 1996 vs 2006



Corelation between 1996 and 2006 : 0.9239366658879741

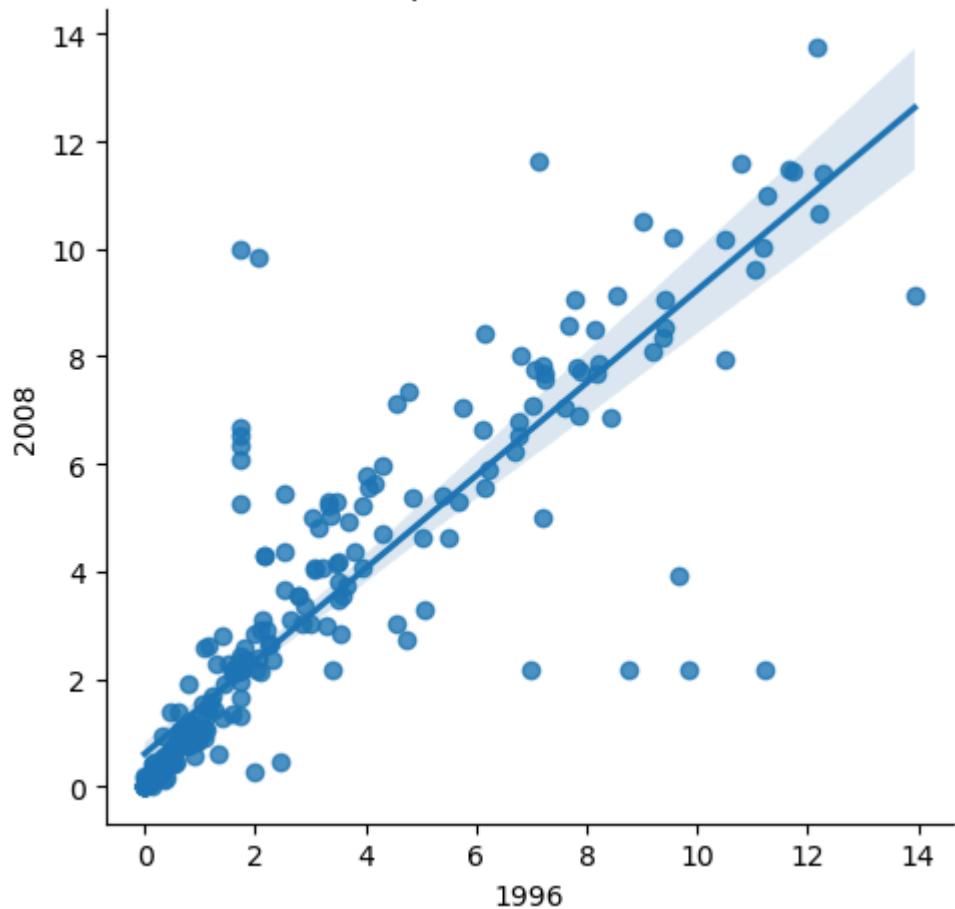
Corelation: Positively Corelated.

Scaterplot of 1996 vs 2007



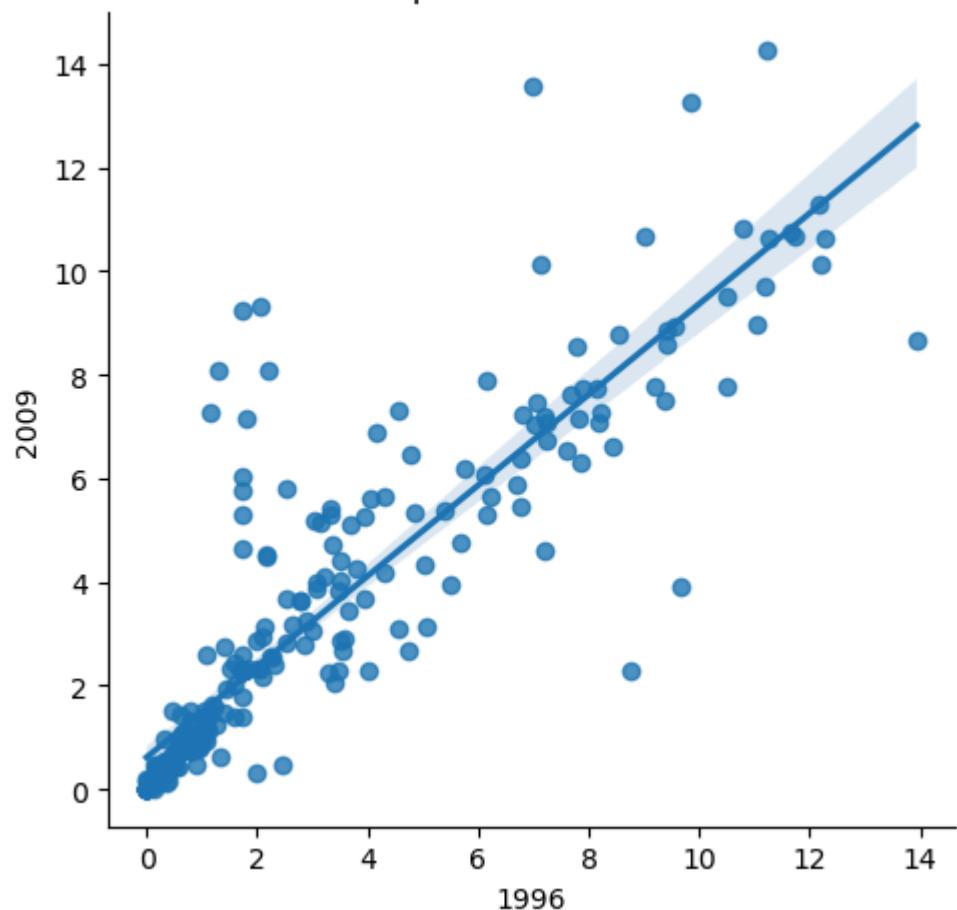
Corelation between 1996 and 2007 : 0.8980752531103694

Corelation: Positively Corelated.

Scaterplot of 1996 vs 2008

Corelation between 1996 and 2008 : 0.8806265954942982

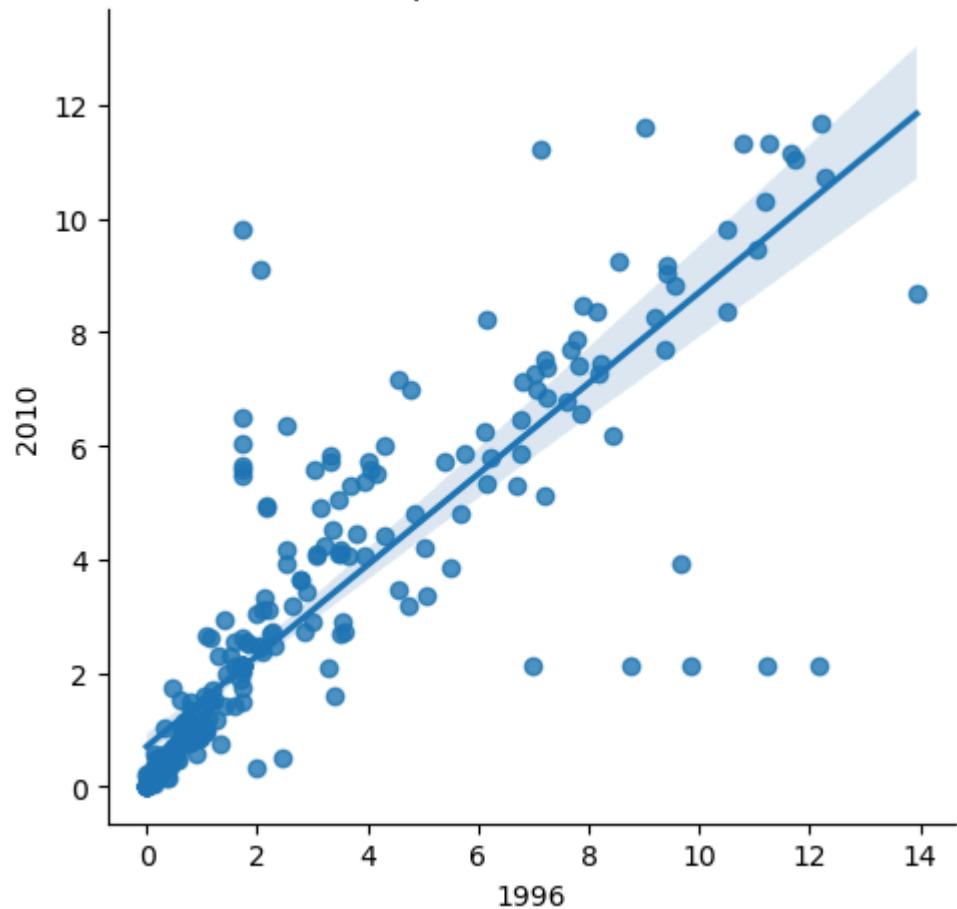
Corelation: Positively Corelated.

Scaterplot of 1996 vs 2009

Corelation between 1996 and 2009 : 0.8834274791333999

Corelation: Positively Corelated.

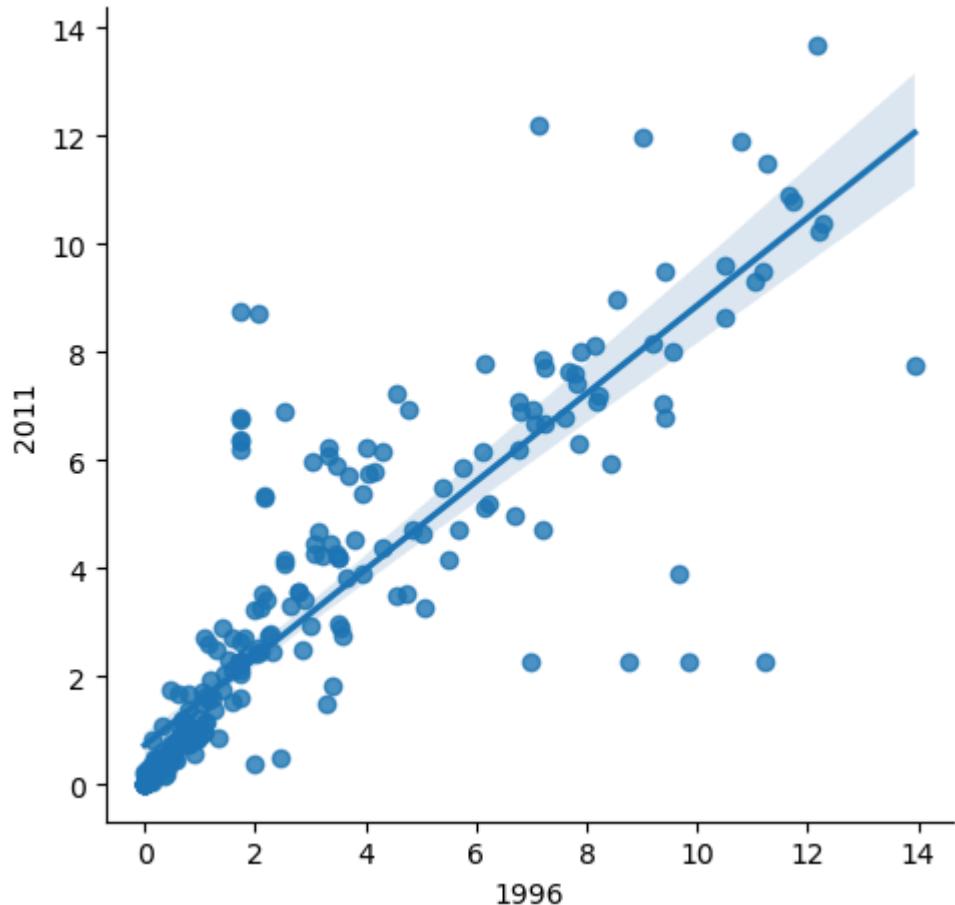
Scaterplot of 1996 vs 2010



Corelation between 1996 and 2010 : 0.855624297641739

Corelation: Positively Corelated.

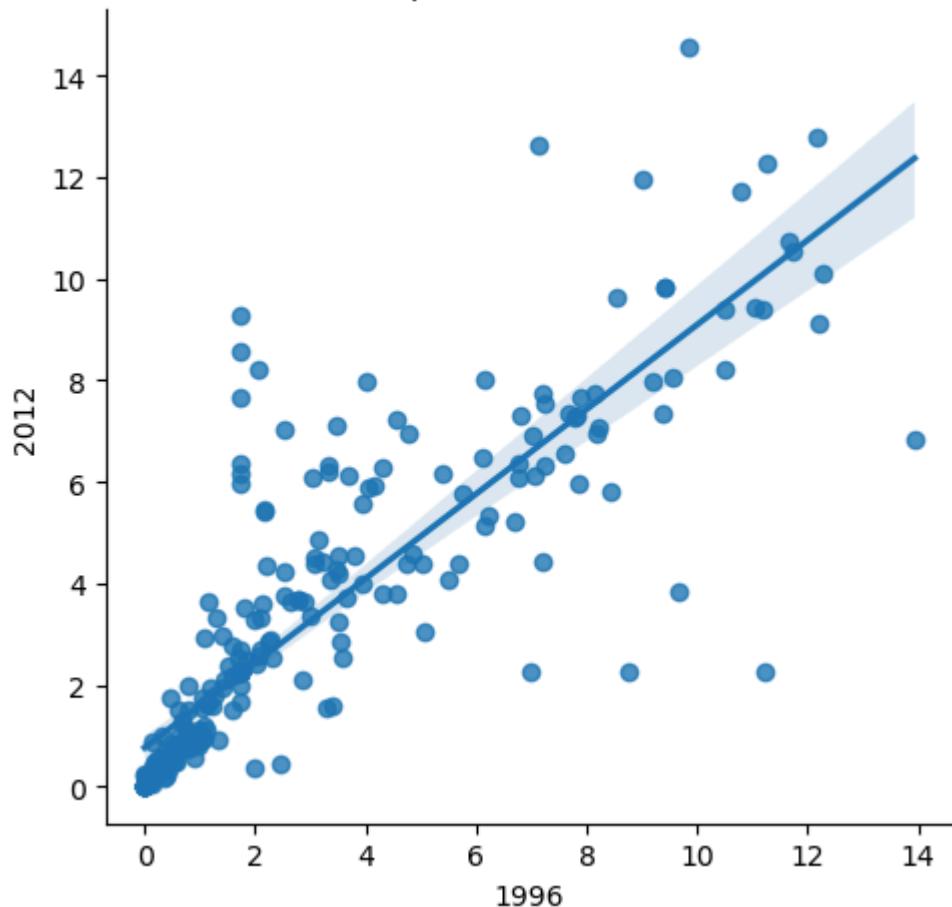
Scaterplot of 1996 vs 2011



Corelation between 1996 and 2011 : 0.861621588735297

Corelation: Positively Corelated.

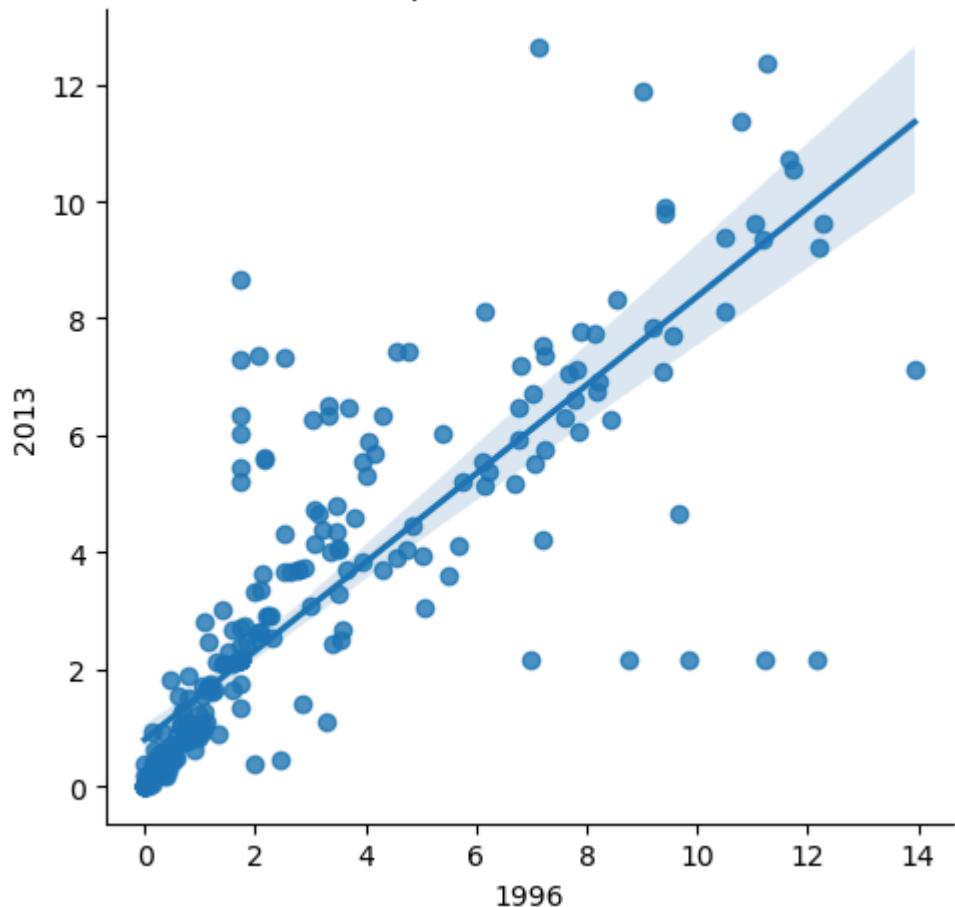
Scaterplot of 1996 vs 2012



Corelation between 1996 and 2012 : 0.8549773480731275

Corelation: Positively Corelated.

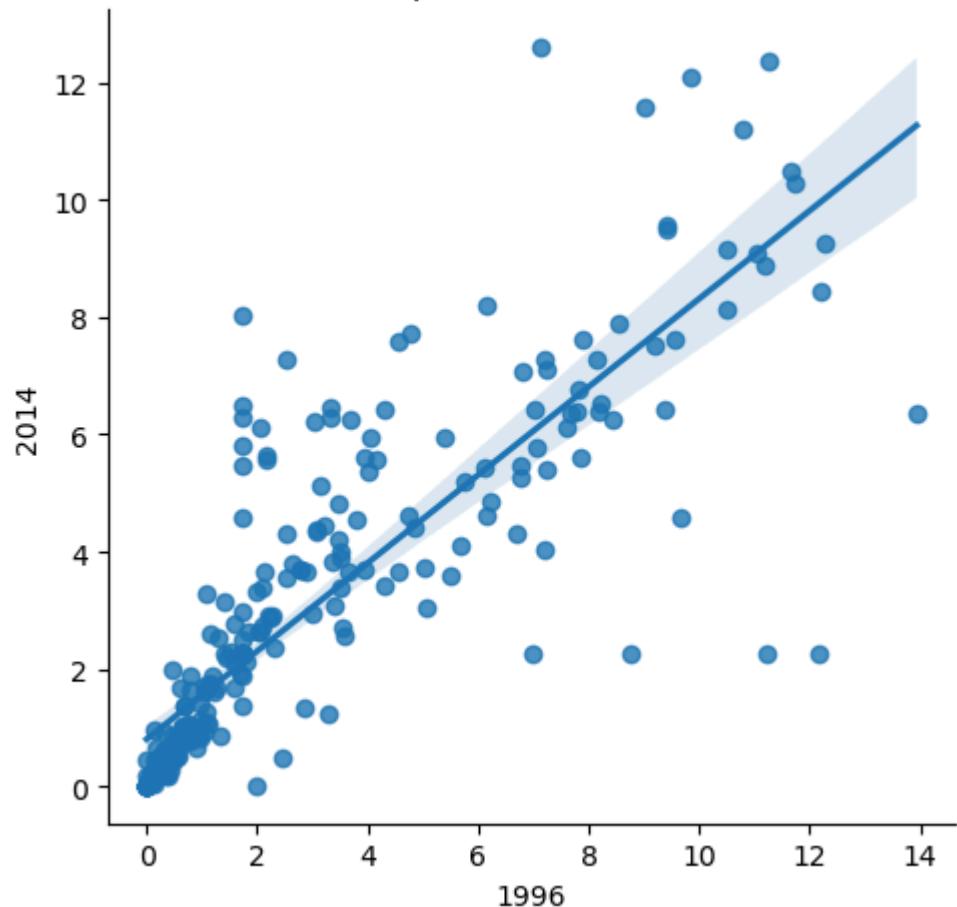
Scaterplot of 1996 vs 2013



Corelation between 1996 and 2013 : 0.8356677087698239

Corelation: Positively Corelated.

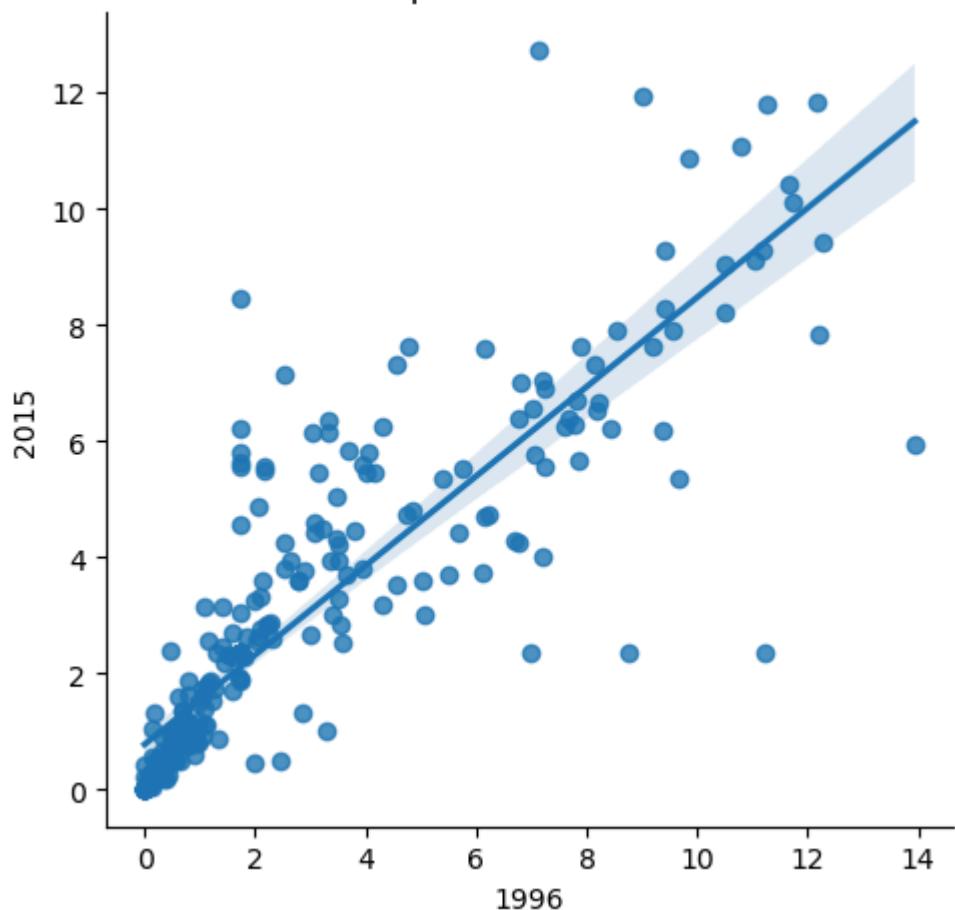
Scaterplot of 1996 vs 2014



Corelation between 1996 and 2014 : 0.842022352674072

Corelation: Positively Corelated.

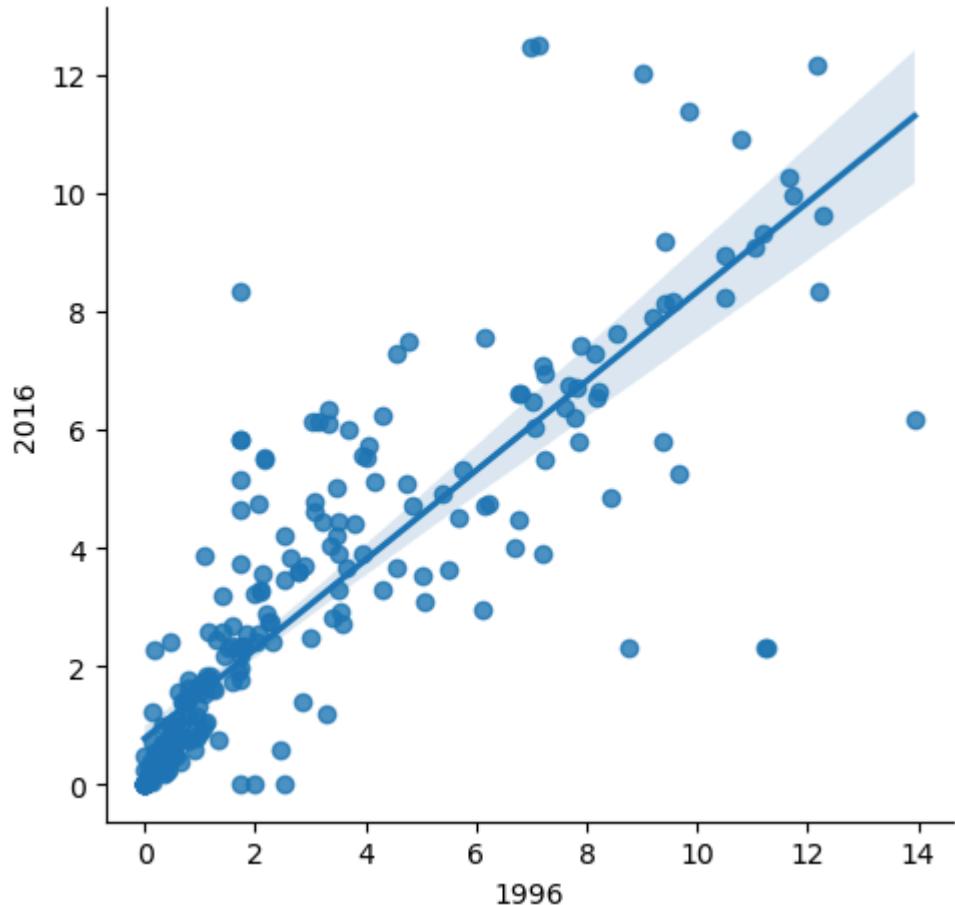
Scaterplot of 1996 vs 2015



Corelation between 1996 and 2015 : 0.86392909126811

Corelation: Positively Corelated.

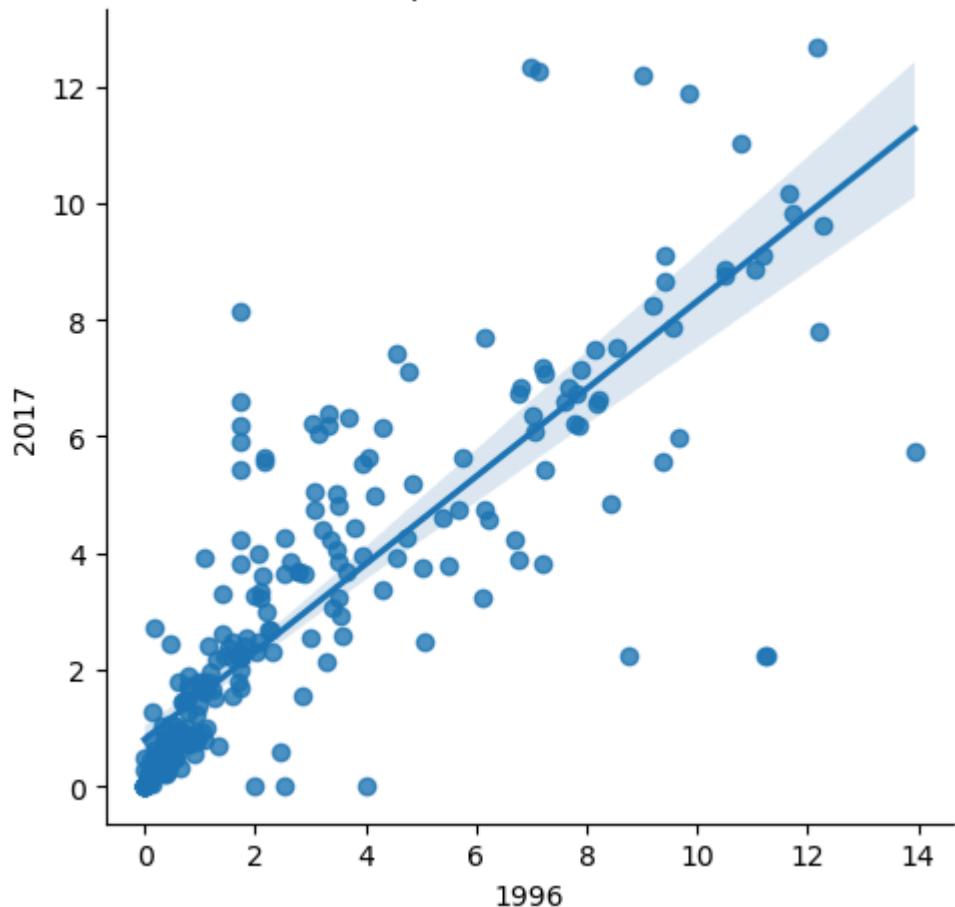
Scaterplot of 1996 vs 2016



Corelation between 1996 and 2016 : 0.8490224089510762

Corelation: Positively Corelated.

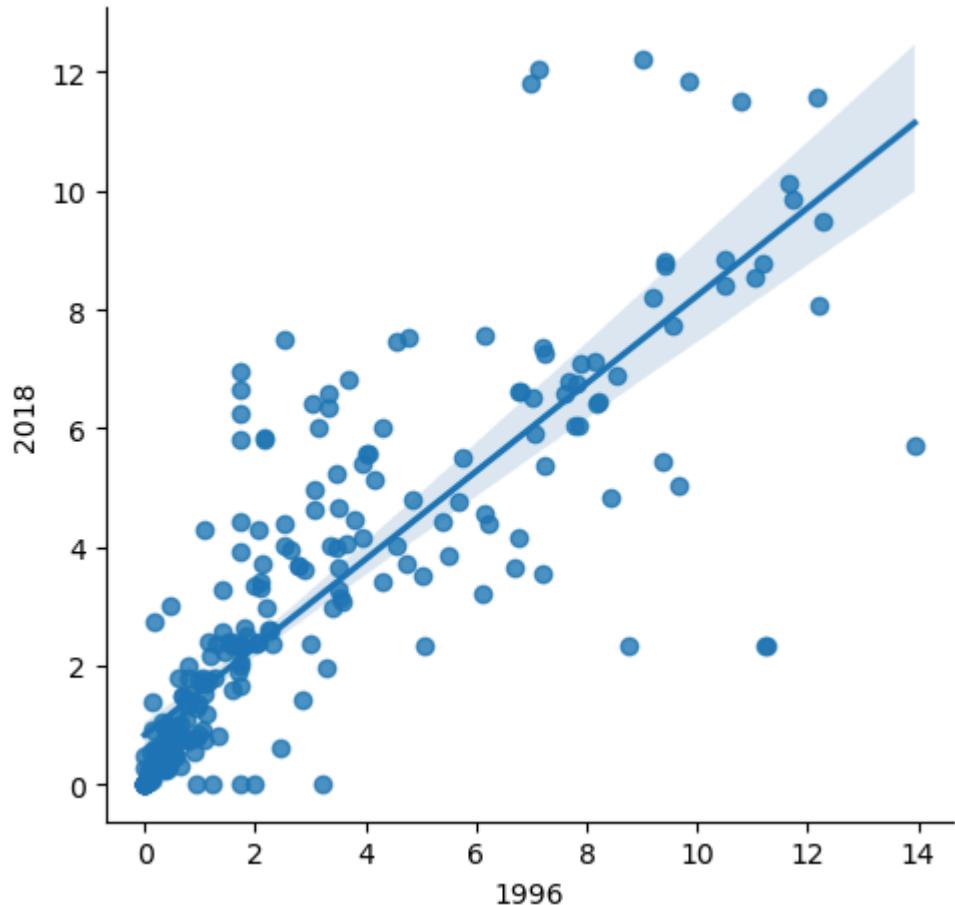
Scaterplot of 1996 vs 2017



Corelation between 1996 and 2017 : 0.8397139757393826

Corelation: Positively Corelated.

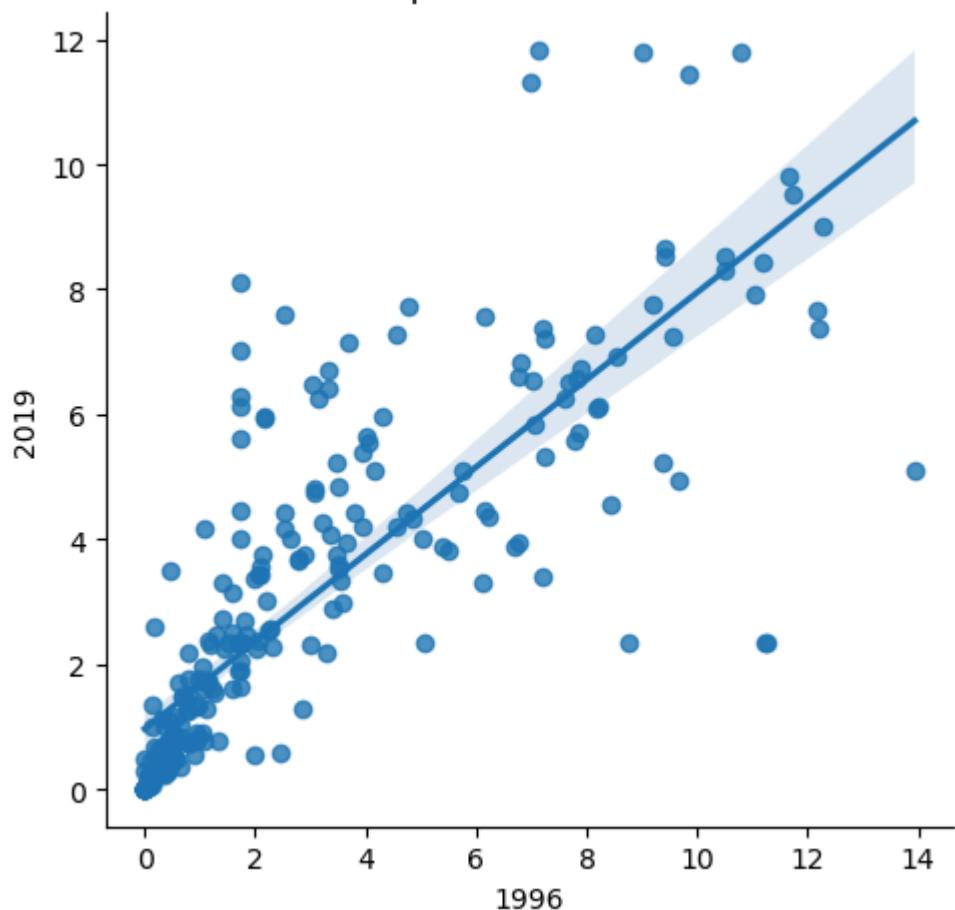
Scaterplot of 1996 vs 2018



Corelation between 1996 and 2018 : 0.8340174610885939

Corelation: Positively Corelated.

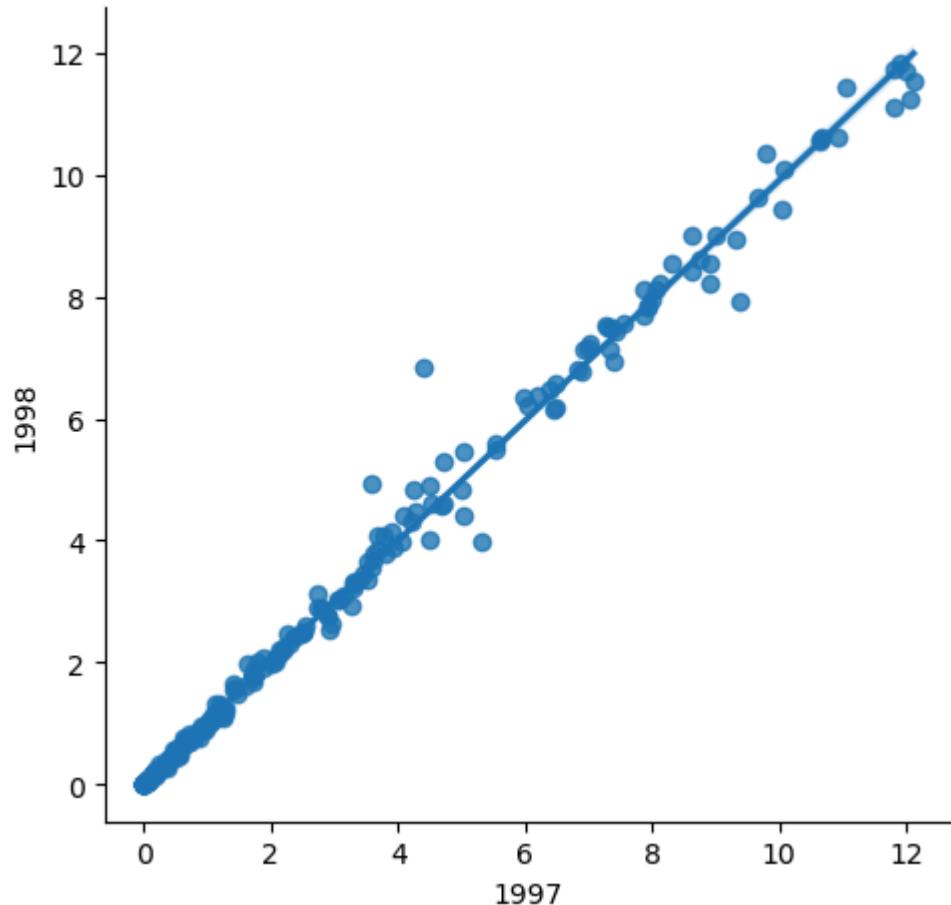
Scaterplot of 1996 vs 2019



Corelation between 1996 and 2019 : 0.8148429234236451

Corelation: Positively Corelated.

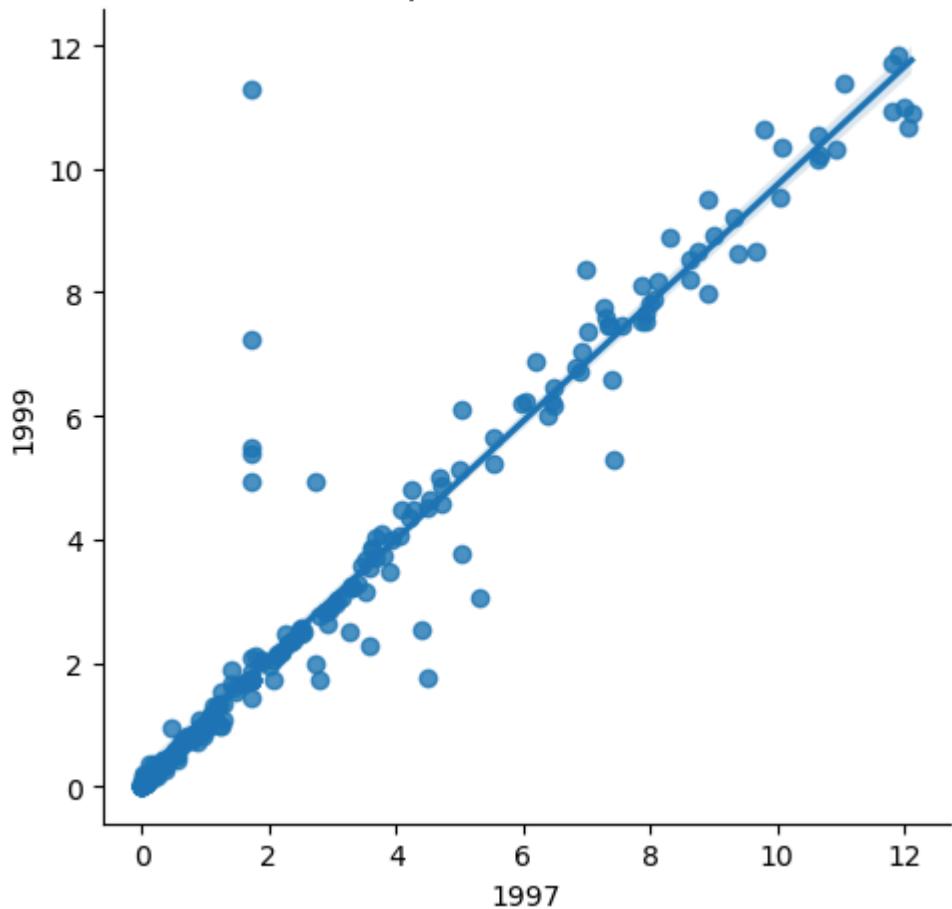
Scaterplot of 1997 vs 1998



Corelation between 1997 and 1998 : 0.9963950770681401

Corelation: Positively Corelated.

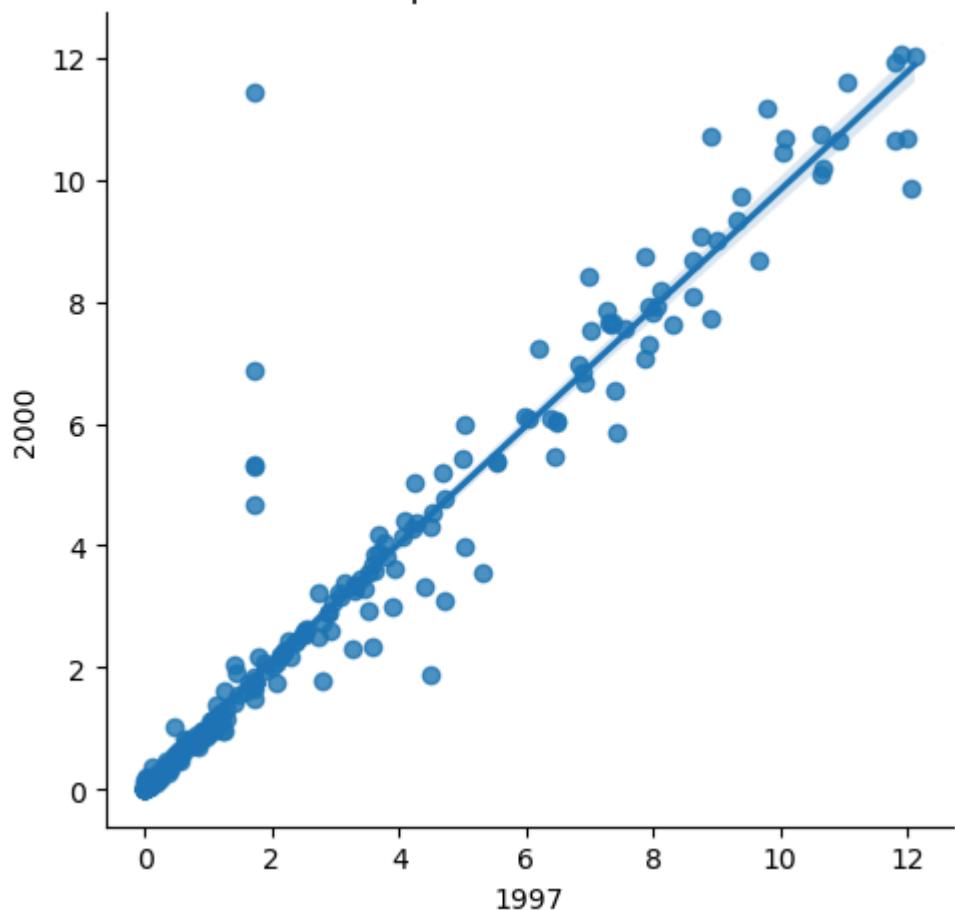
Scaterplot of 1997 vs 1999



Corelation between 1997 and 1999 : 0.9612264079360973

Corelation: Positively Corelated.

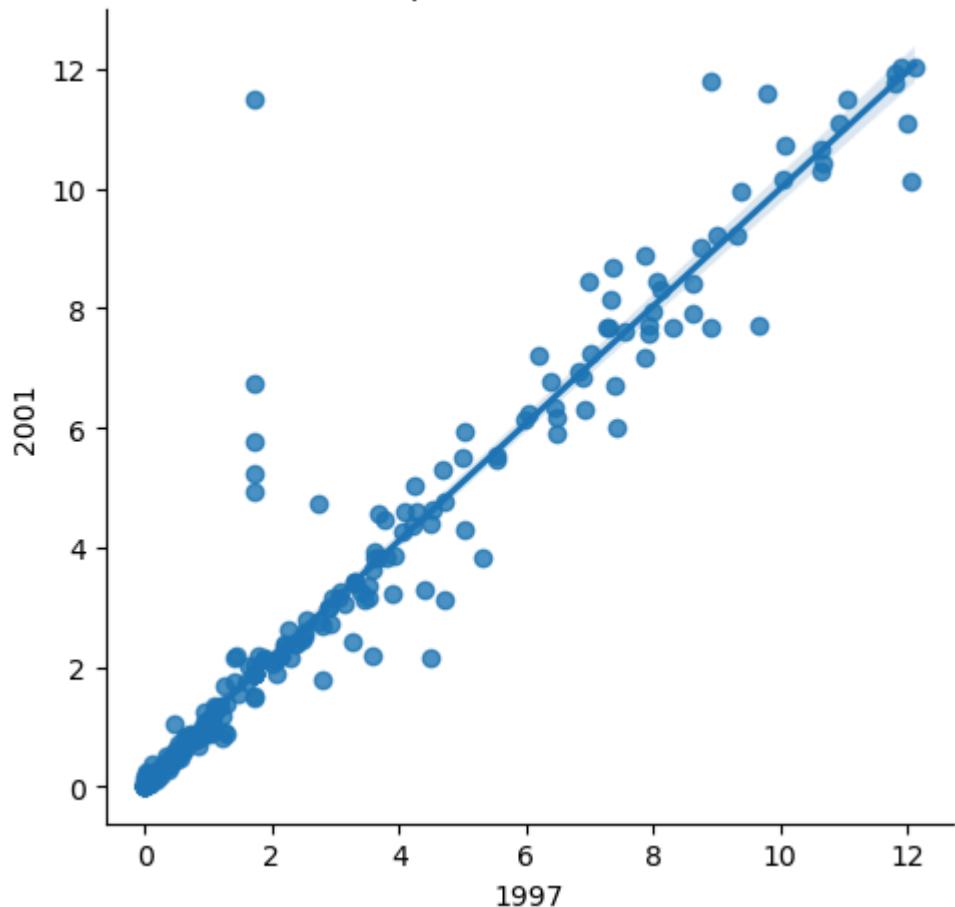
Scaterplot of 1997 vs 2000



Corelation between 1997 and 2000 : 0.9620214631189535

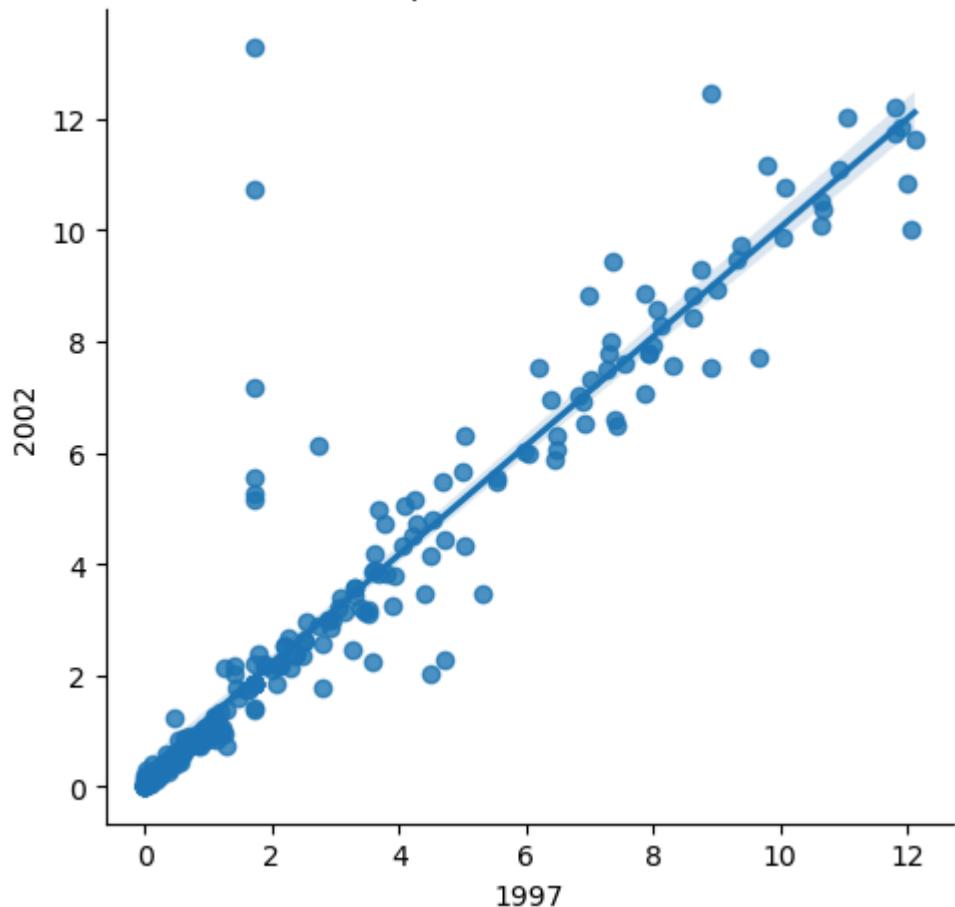
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2001



Corelation between 1997 and 2001 : 0.9606959904460202

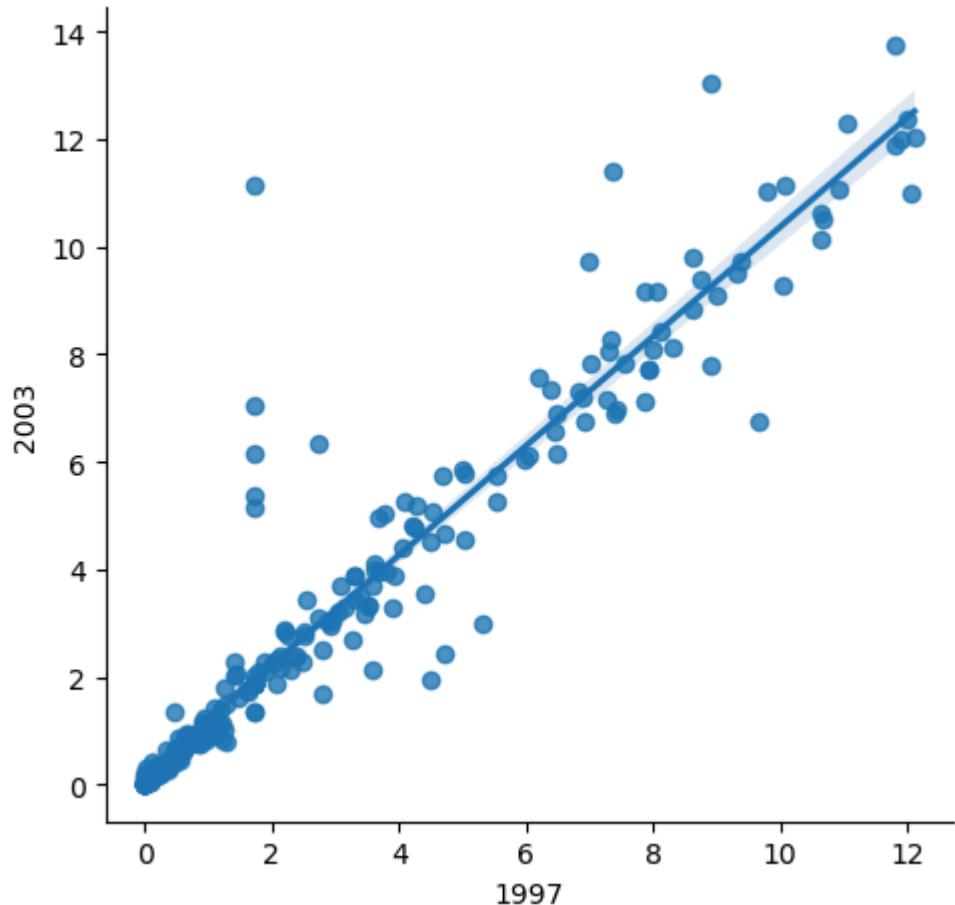
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2002

Corelation between 1997 and 2002 : 0.9367905875528343

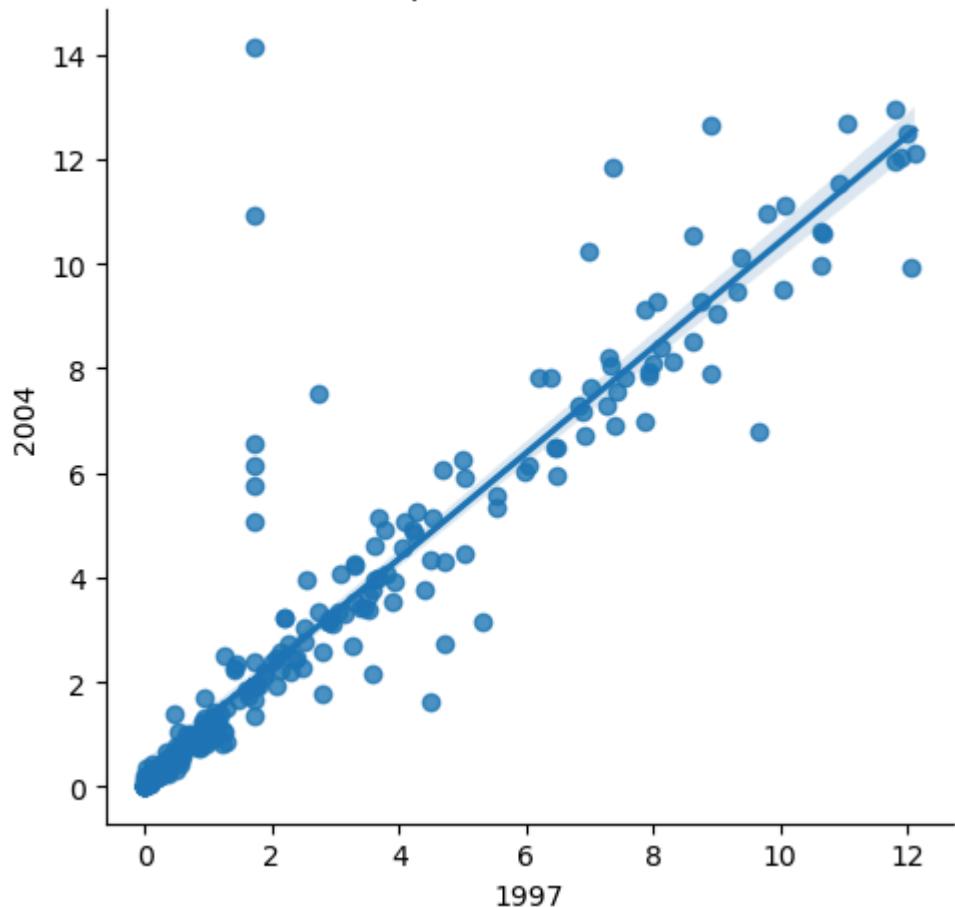
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2003



Corelation between 1997 and 2003 : 0.9549341332458231

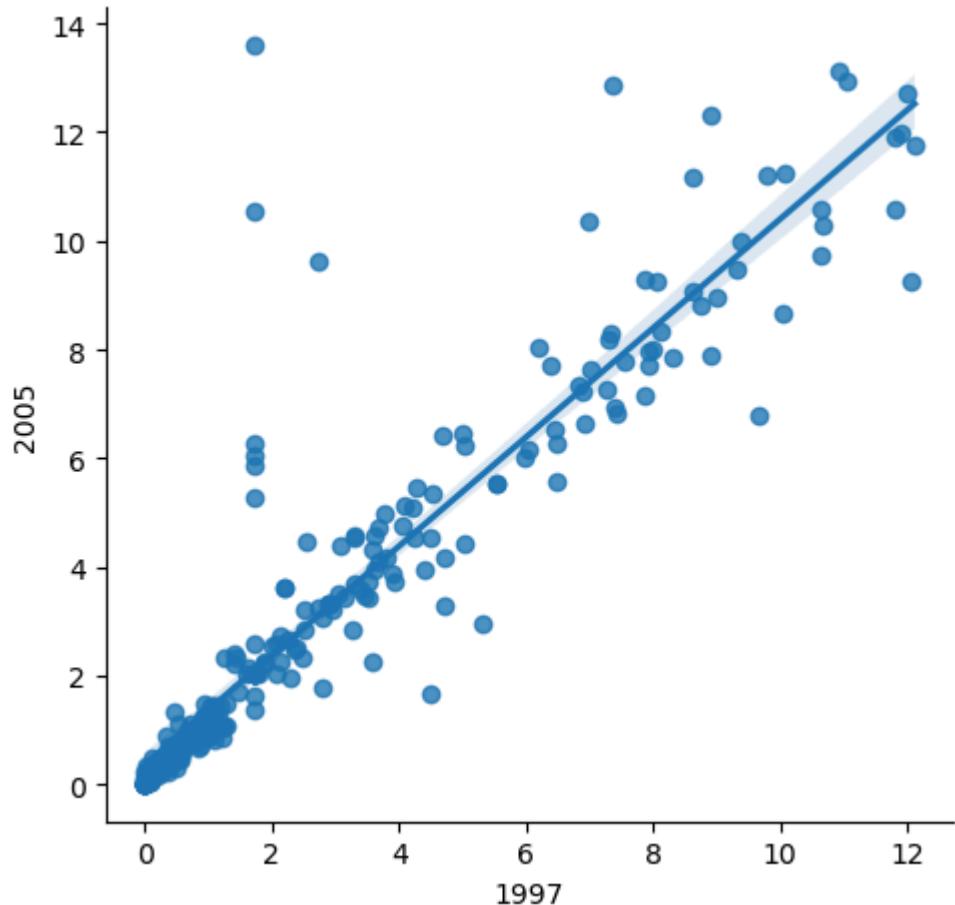
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2004

Corelation between 1997 and 2004 : 0.9298310949942333

Corelation: Positively Corelated.

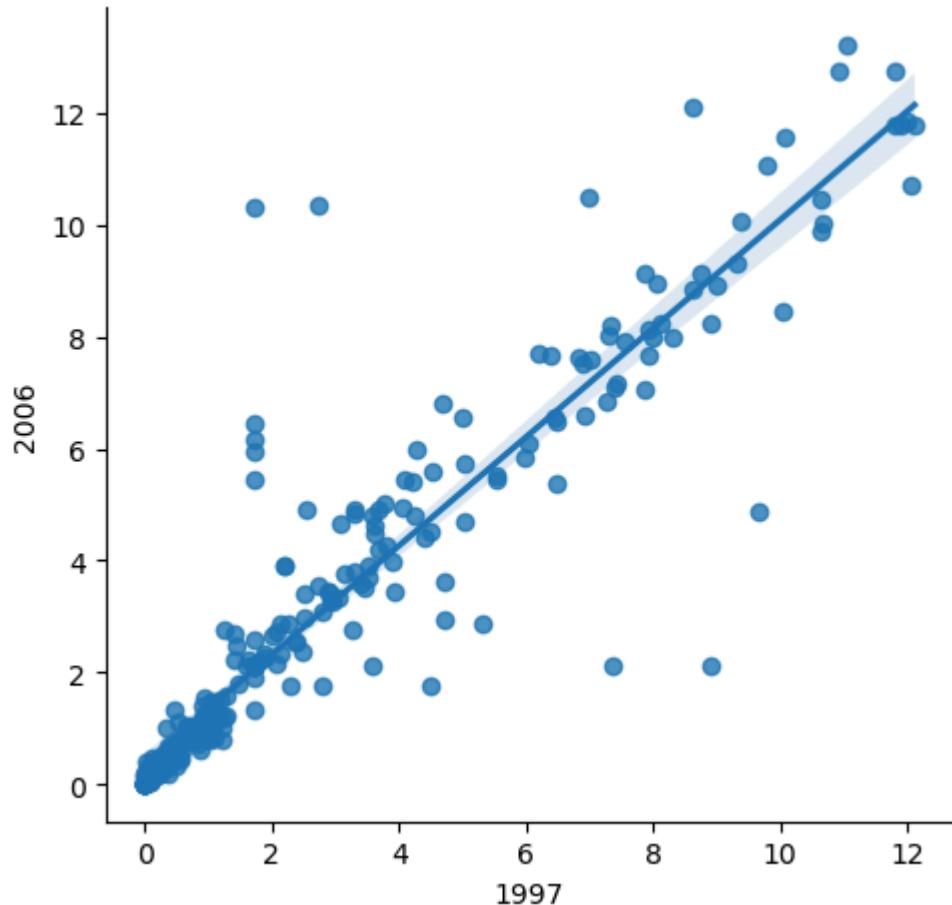
Scaterplot of 1997 vs 2005



Corelation between 1997 and 2005 : 0.9241831285149966

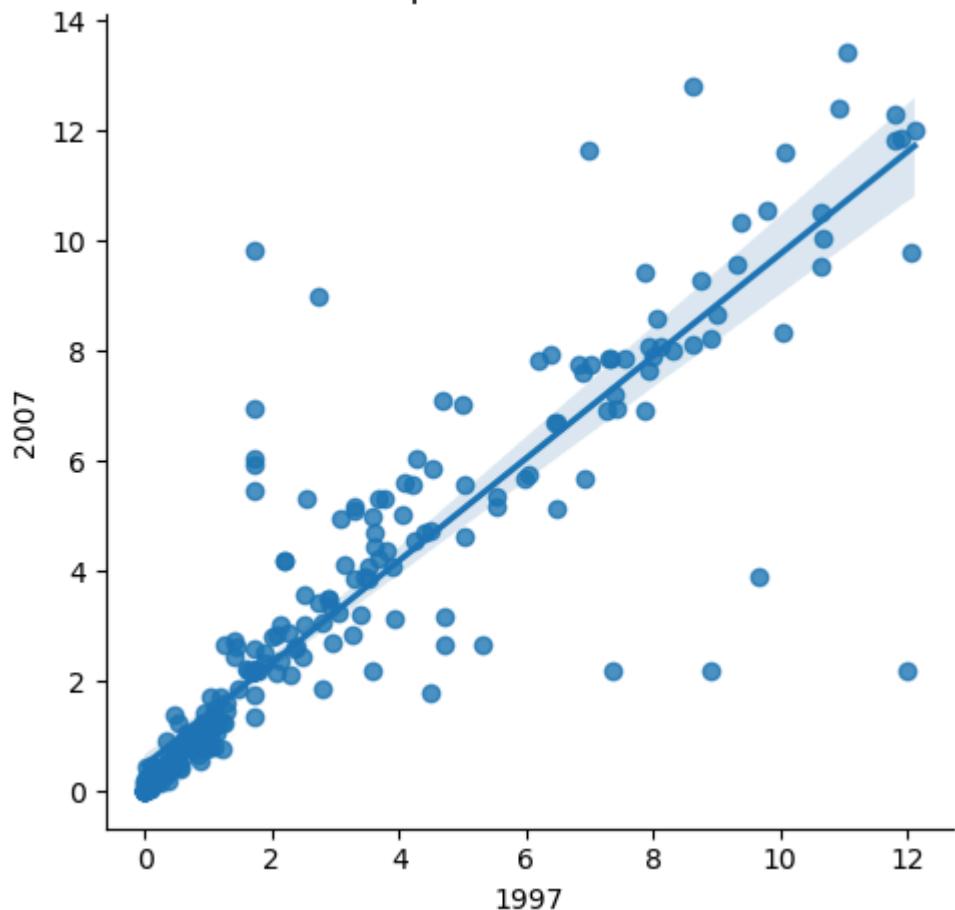
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2006



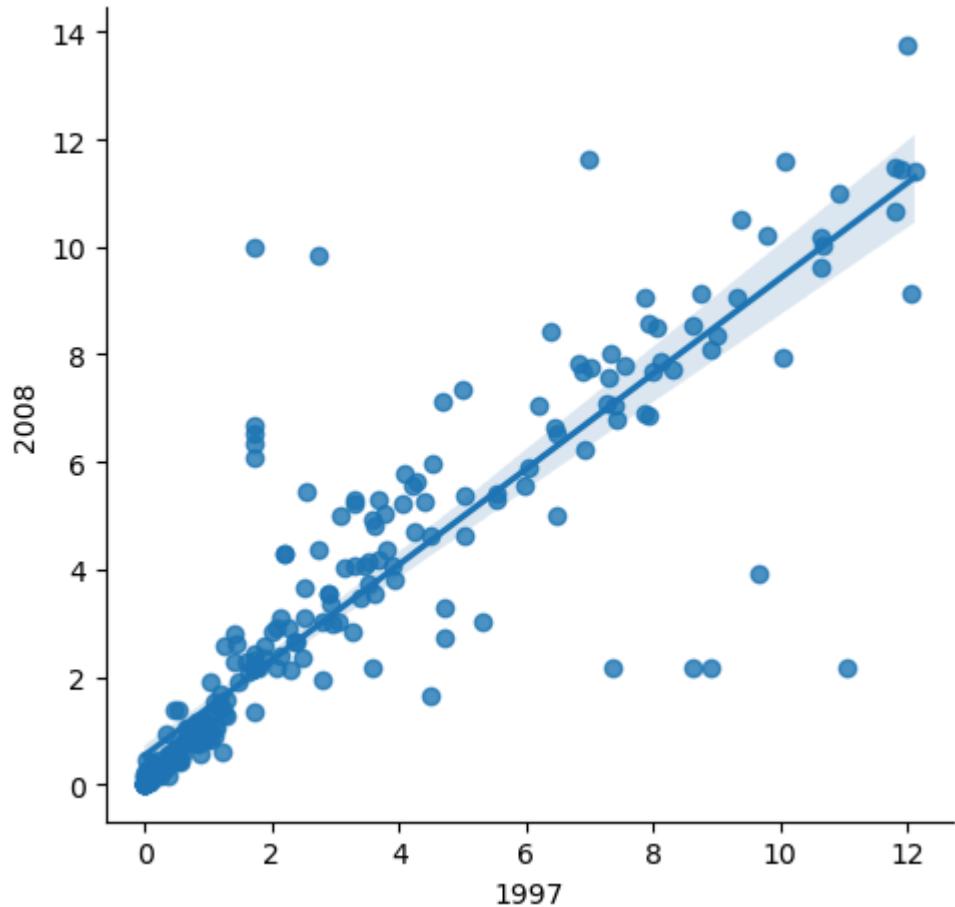
Corelation between 1997 and 2006 : 0.9277649832974749

Corelation: Positively Corelated.

Scaterplot of 1997 vs 2007

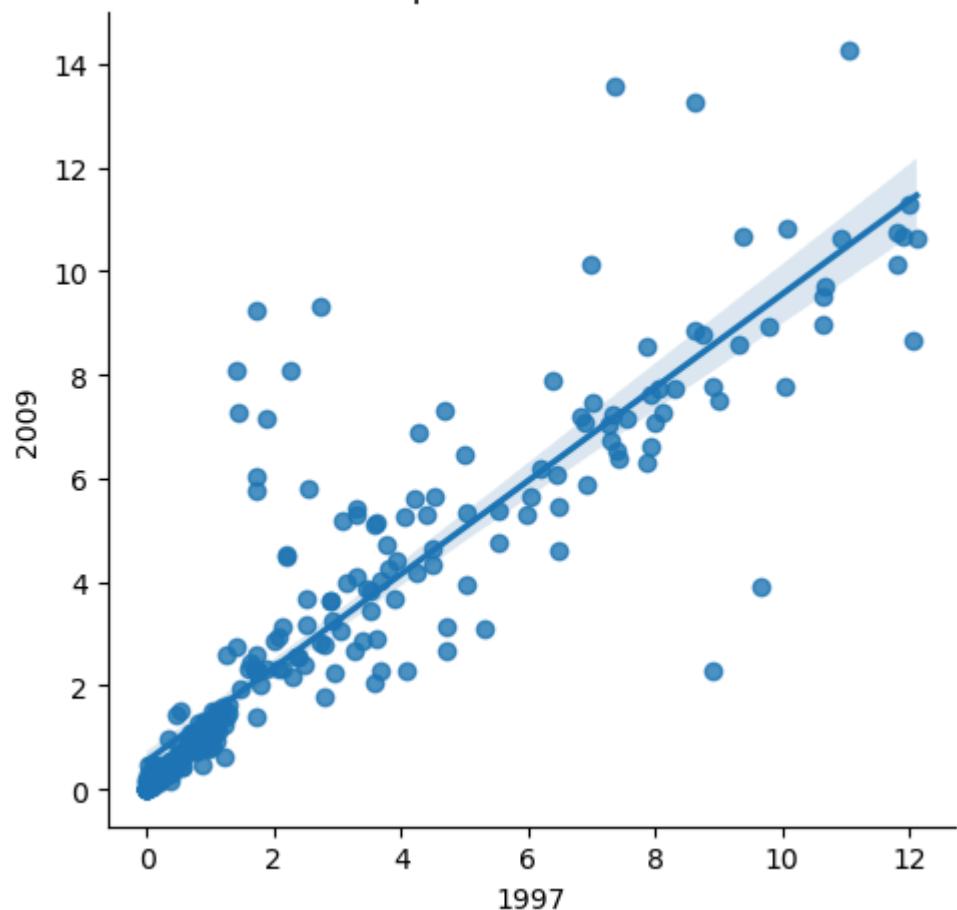
Corelation between 1997 and 2007 : 0.9026654055251951

Corelation: Positively Corelated.

Scaterplot of 1997 vs 2008

Corelation between 1997 and 2008 : 0.8912864820063809

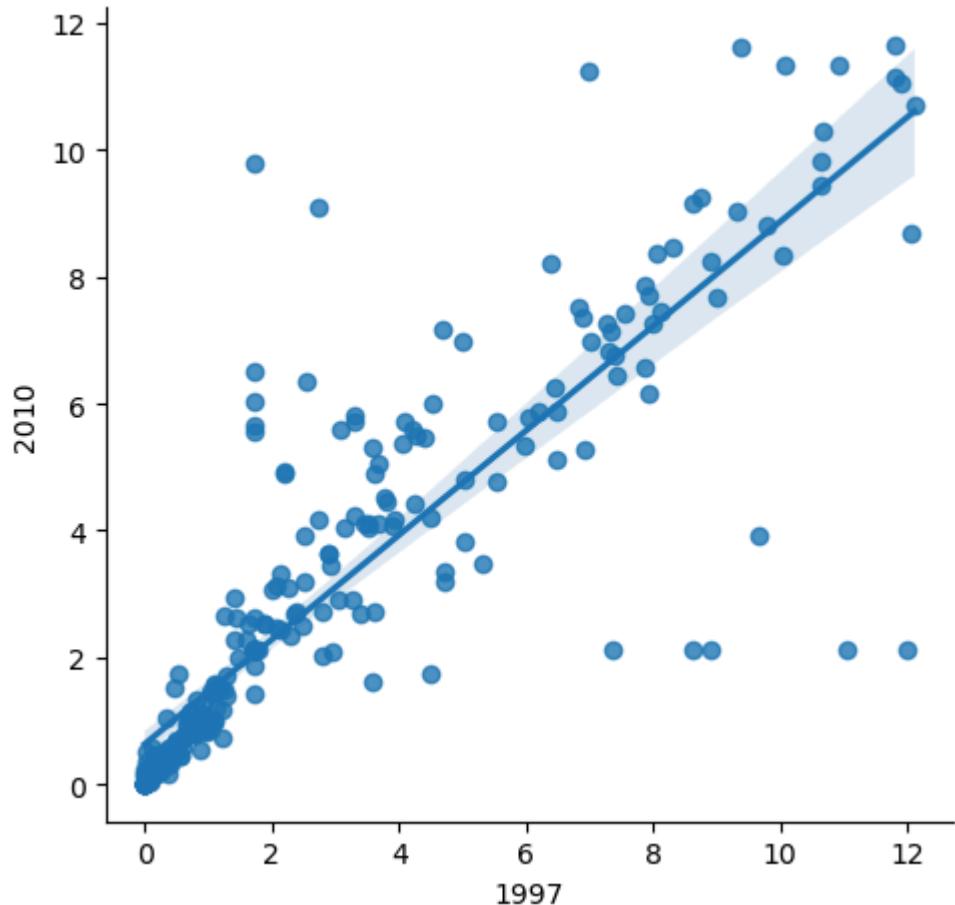
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2009

Corelation between 1997 and 2009 : 0.8947357445730486

Corelation: Positively Corelated.

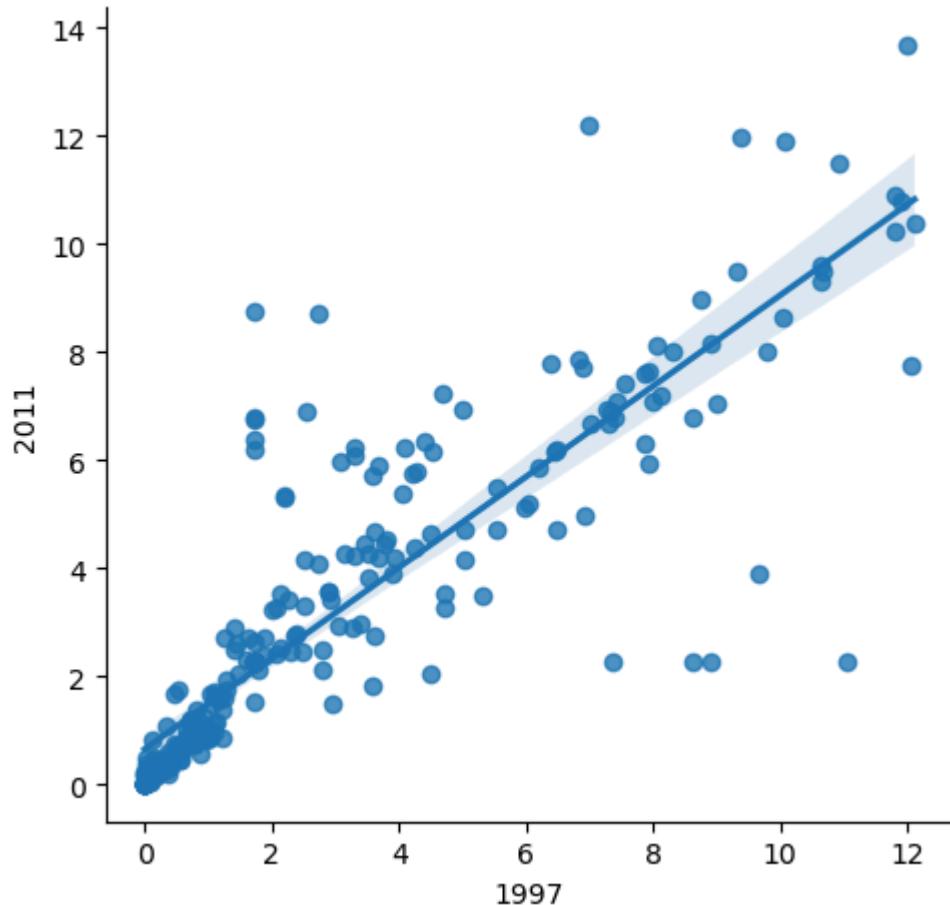
Scaterplot of 1997 vs 2010



Corelation between 1997 and 2010 : 0.8666879479354577

Corelation: Positively Corelated.

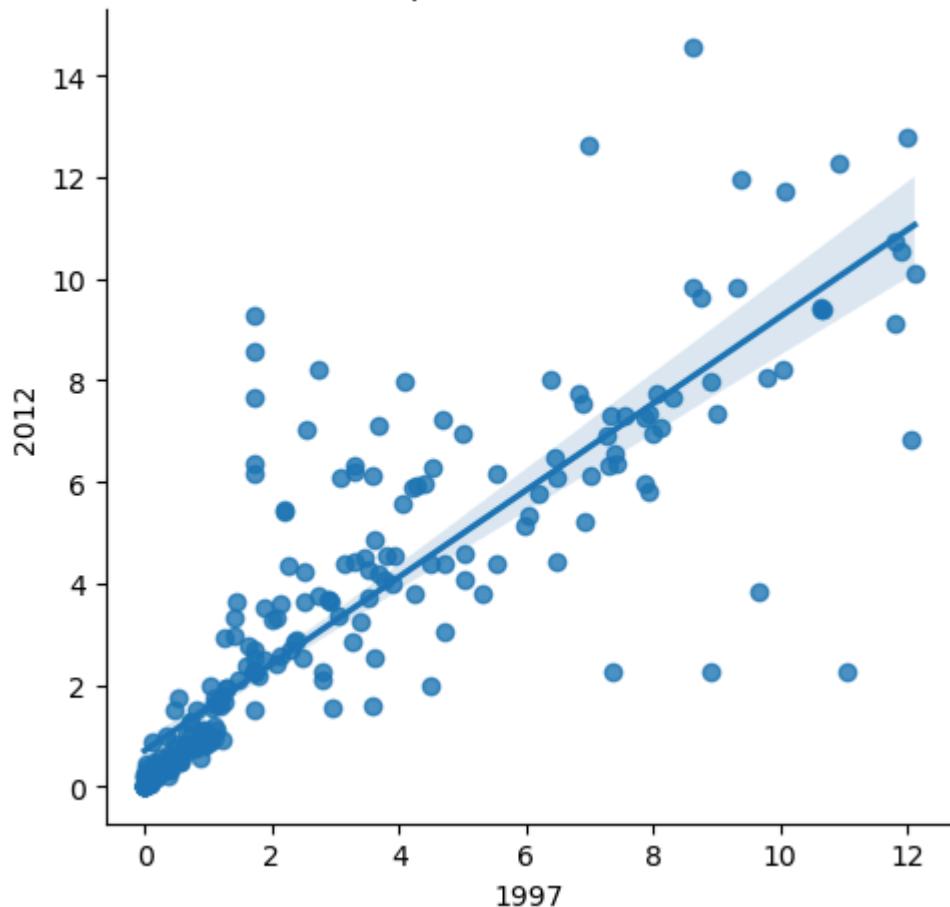
Scaterplot of 1997 vs 2011



Corelation between 1997 and 2011 : 0.8748411620086552

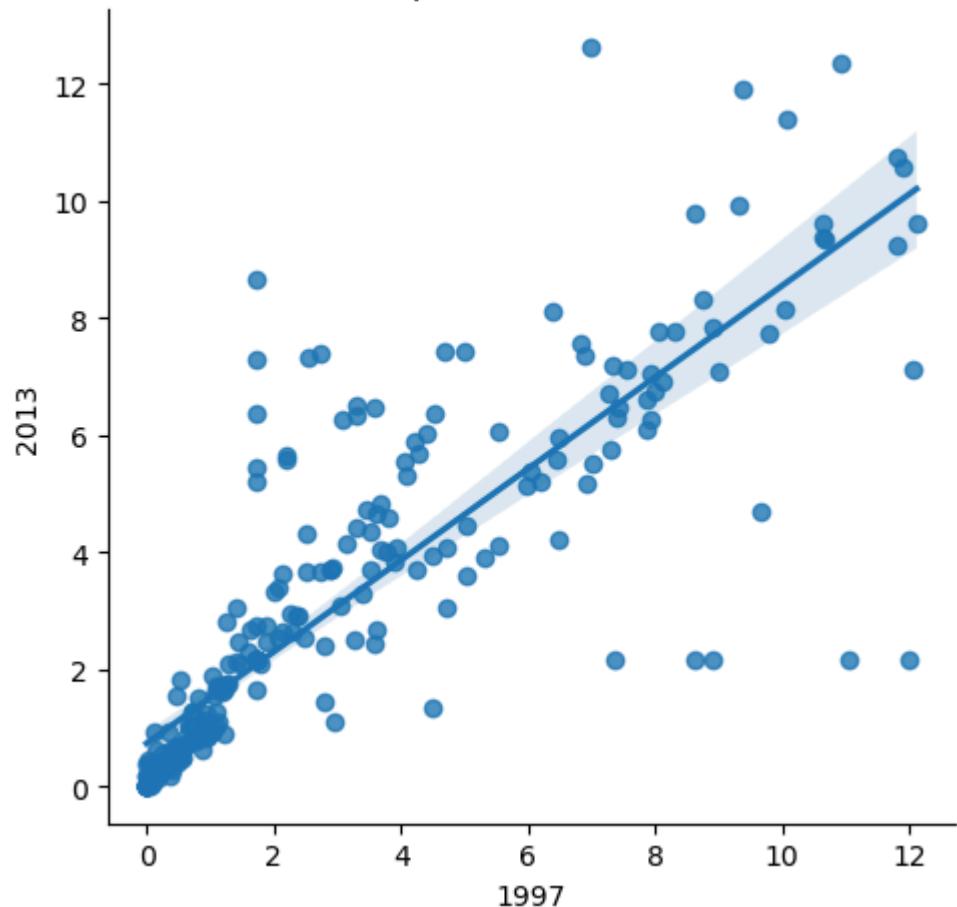
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2012



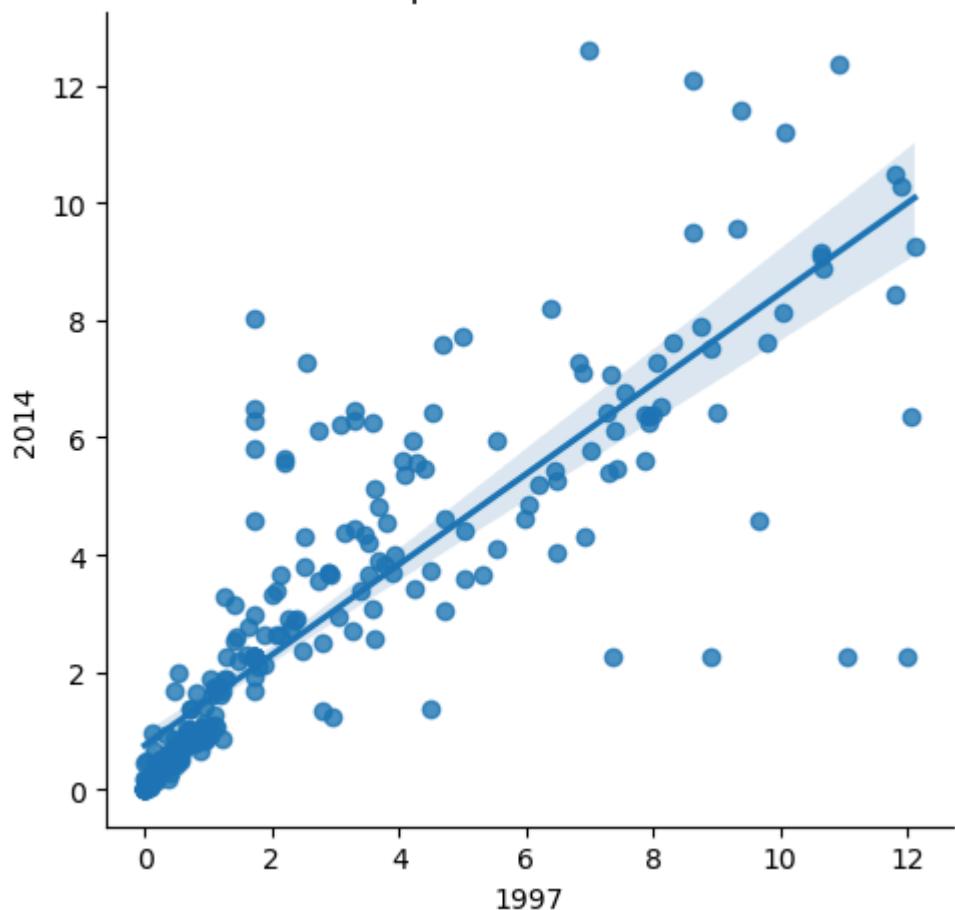
Corelation between 1997 and 2012 : 0.8626867630163702

Corelation: Positively Corelated.

Scaterplot of 1997 vs 2013

Corelation between 1997 and 2013 : 0.8479395995945108

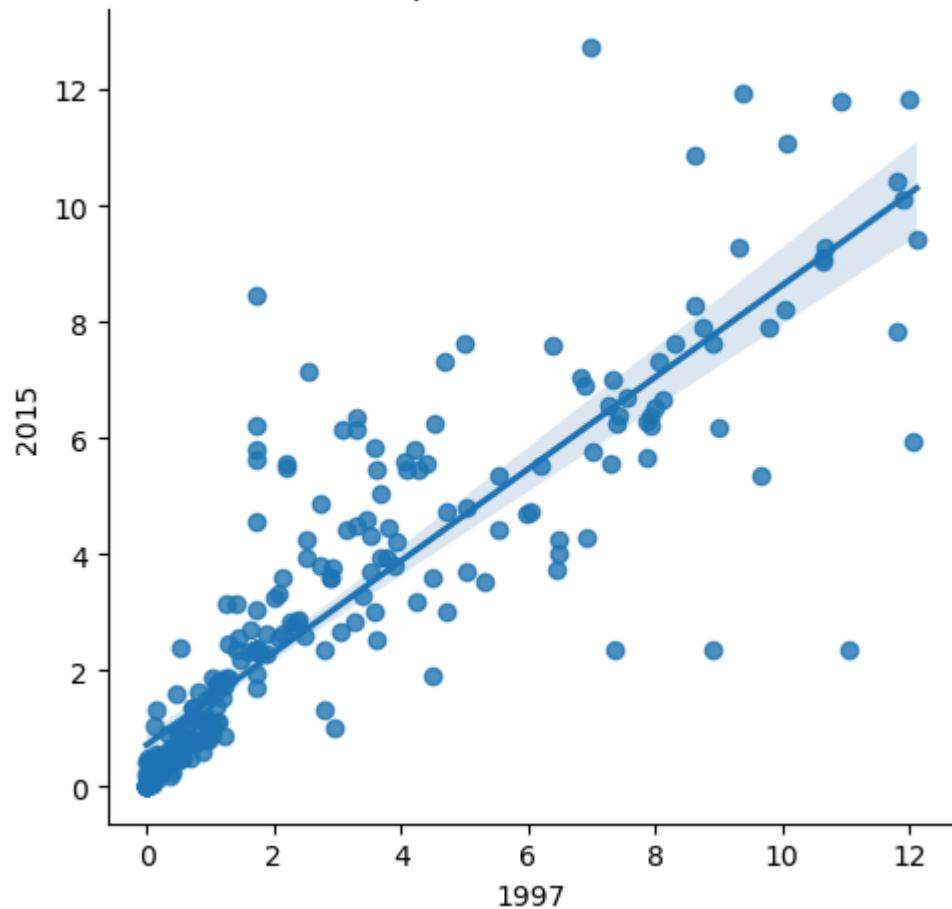
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2014

Corelation between 1997 and 2014 : 0.849839948049253

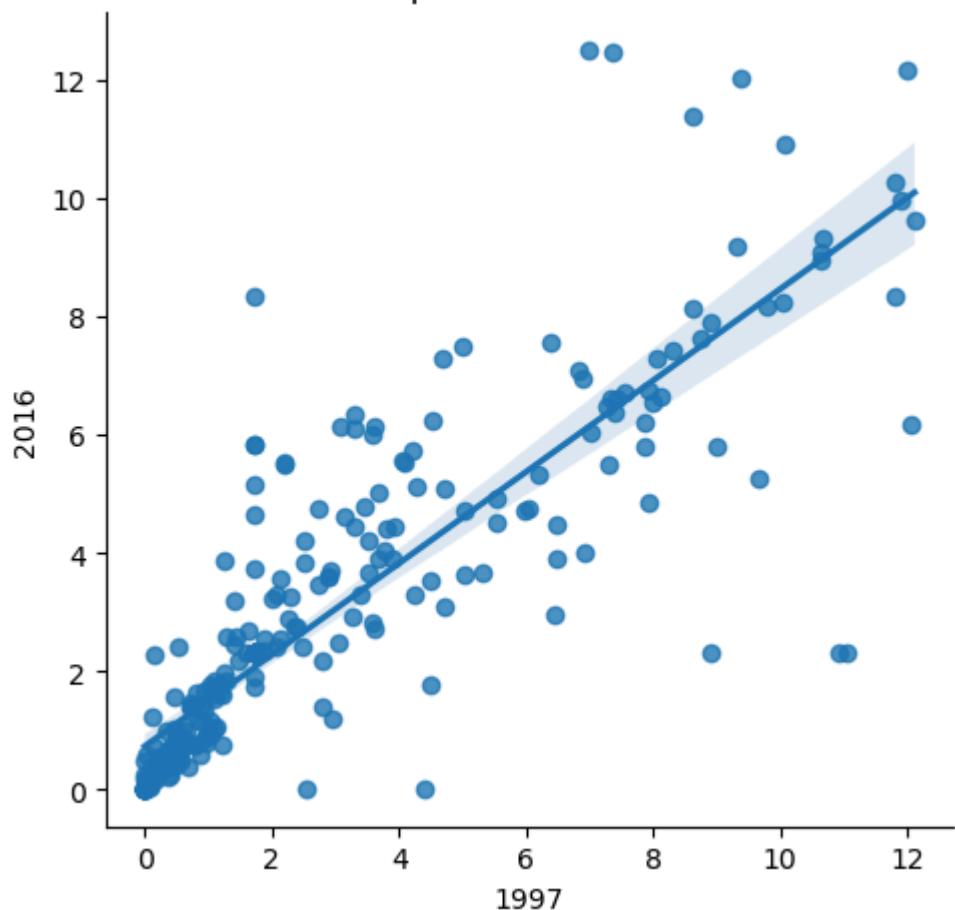
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2015



Corelation between 1997 and 2015 : 0.8732664433742099

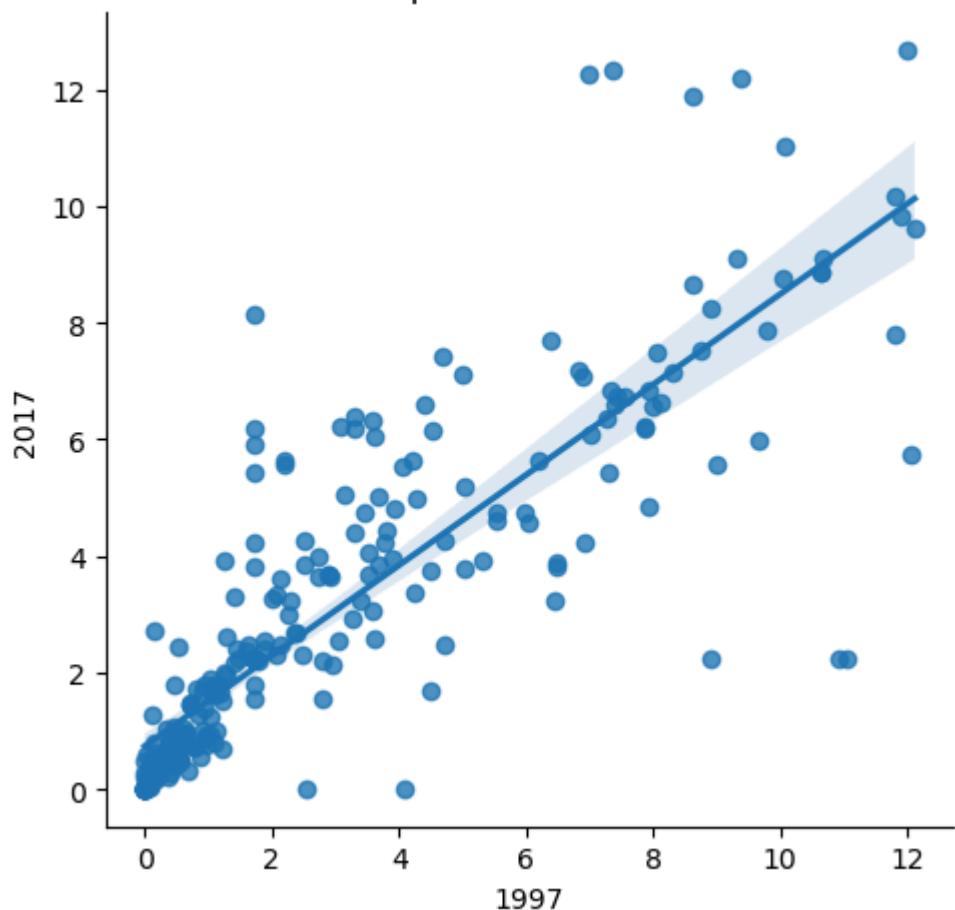
Corelation: Positively Corelated.

Scaterplot of 1997 vs 2016

Corelation between 1997 and 2016 : 0.8546526902293244

Corelation: Positively Corelated.

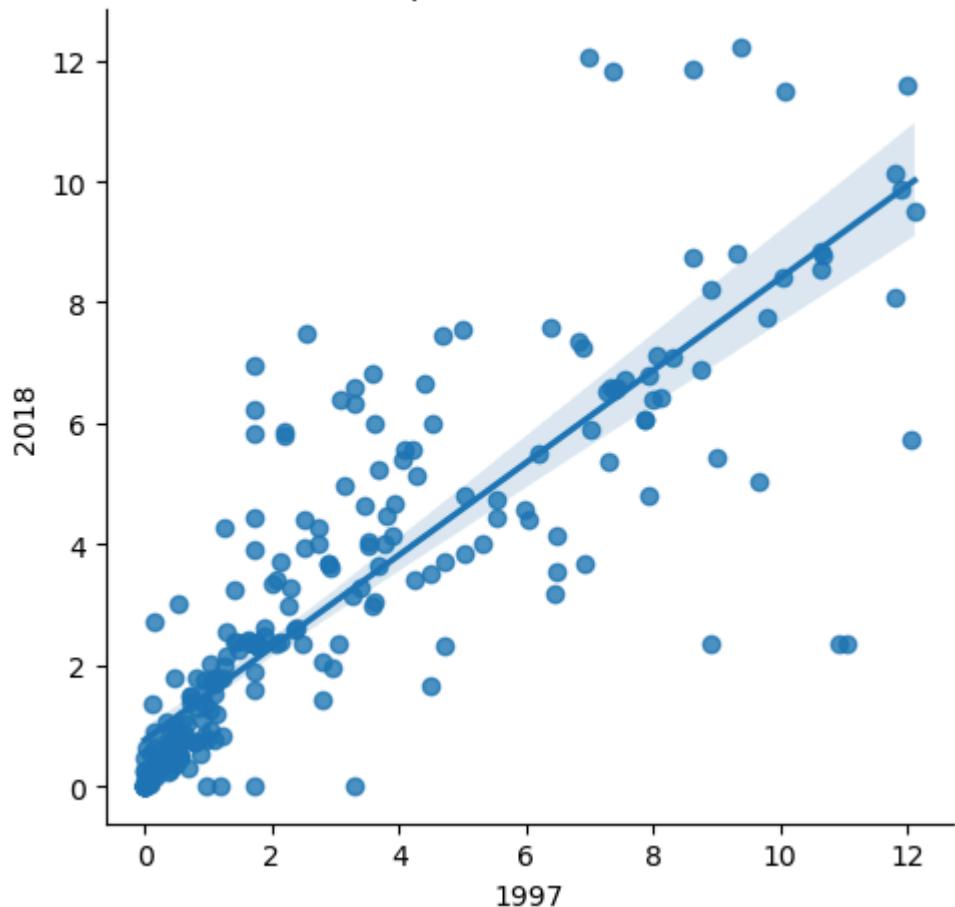
Scaterplot of 1997 vs 2017



Corelation between 1997 and 2017 : 0.8519618777439892

Corelation: Positively Corelated.

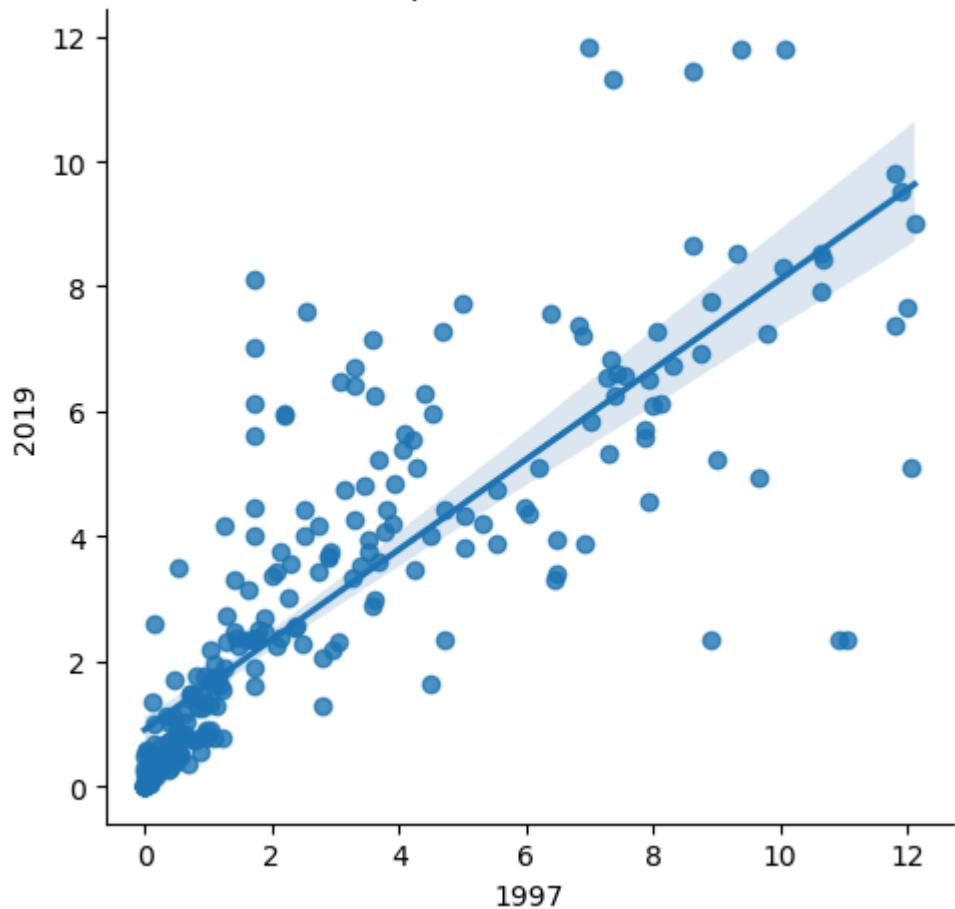
Scaterplot of 1997 vs 2018



Corelation between 1997 and 2018 : 0.8462439861516431

Corelation: Positively Corelated.

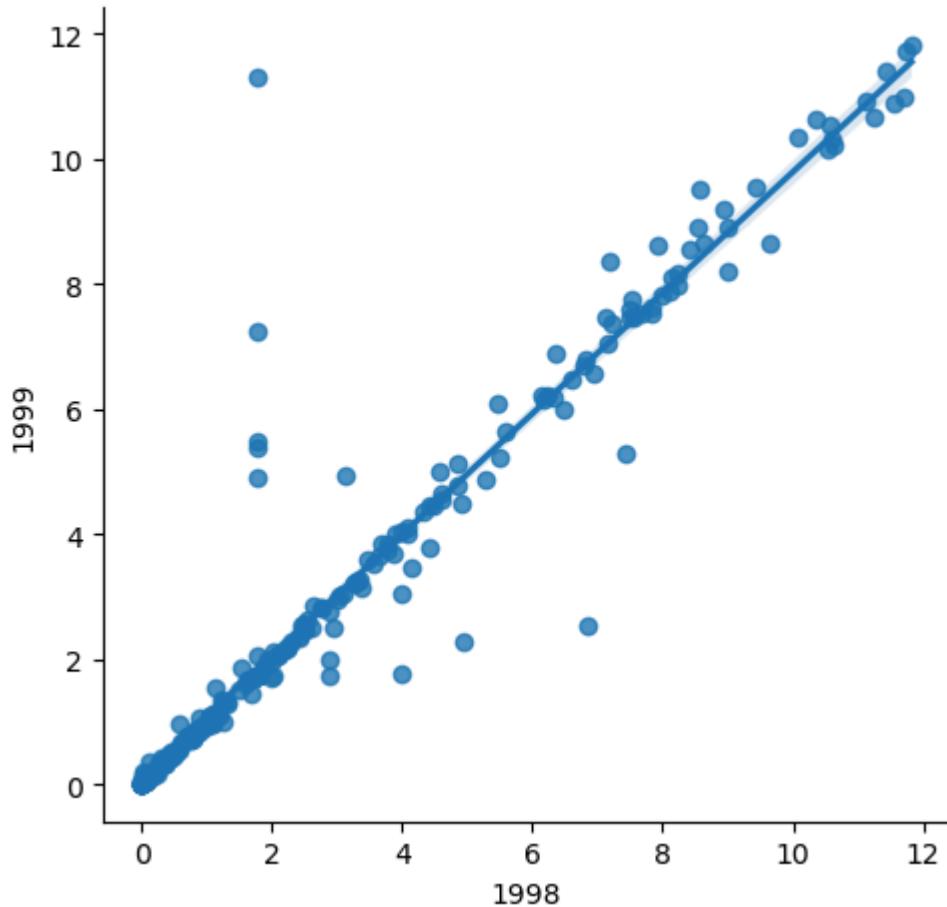
Scaterplot of 1997 vs 2019



Corelation between 1997 and 2019 : 0.826864755705729

Corelation: Positively Corelated.

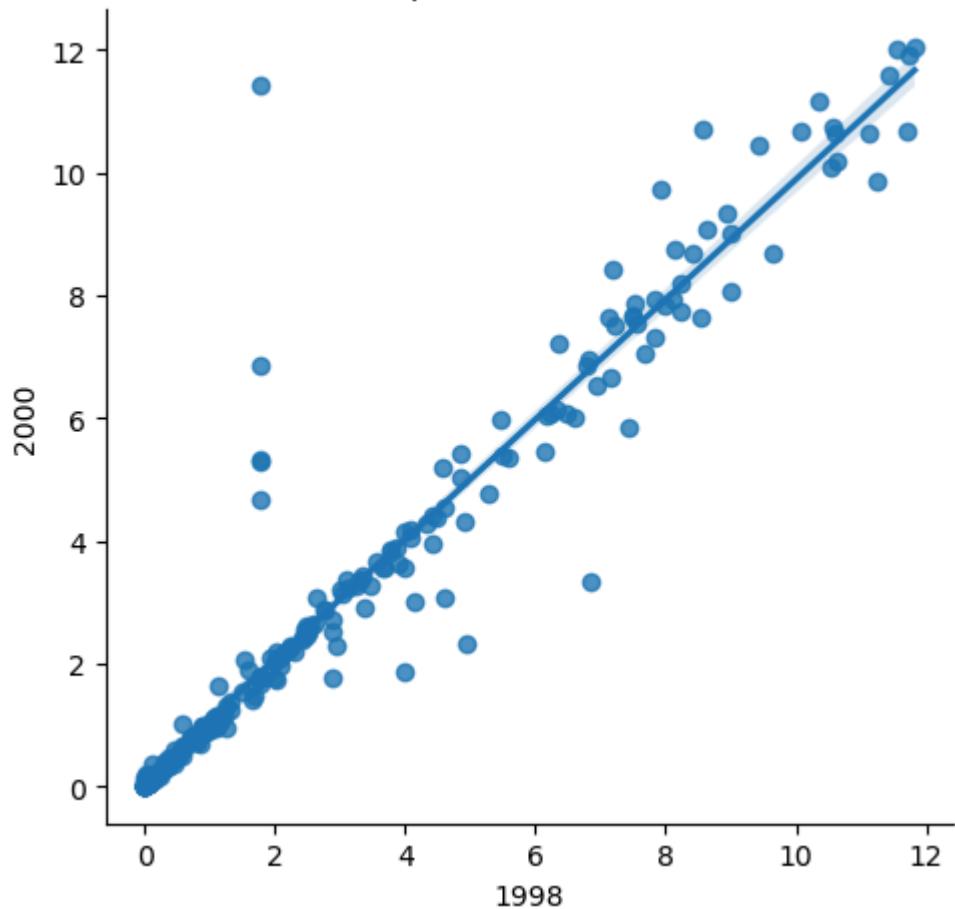
Scaterplot of 1998 vs 1999



Corelation between 1998 and 1999 : 0.9609182297777784

Corelation: Positively Corelated.

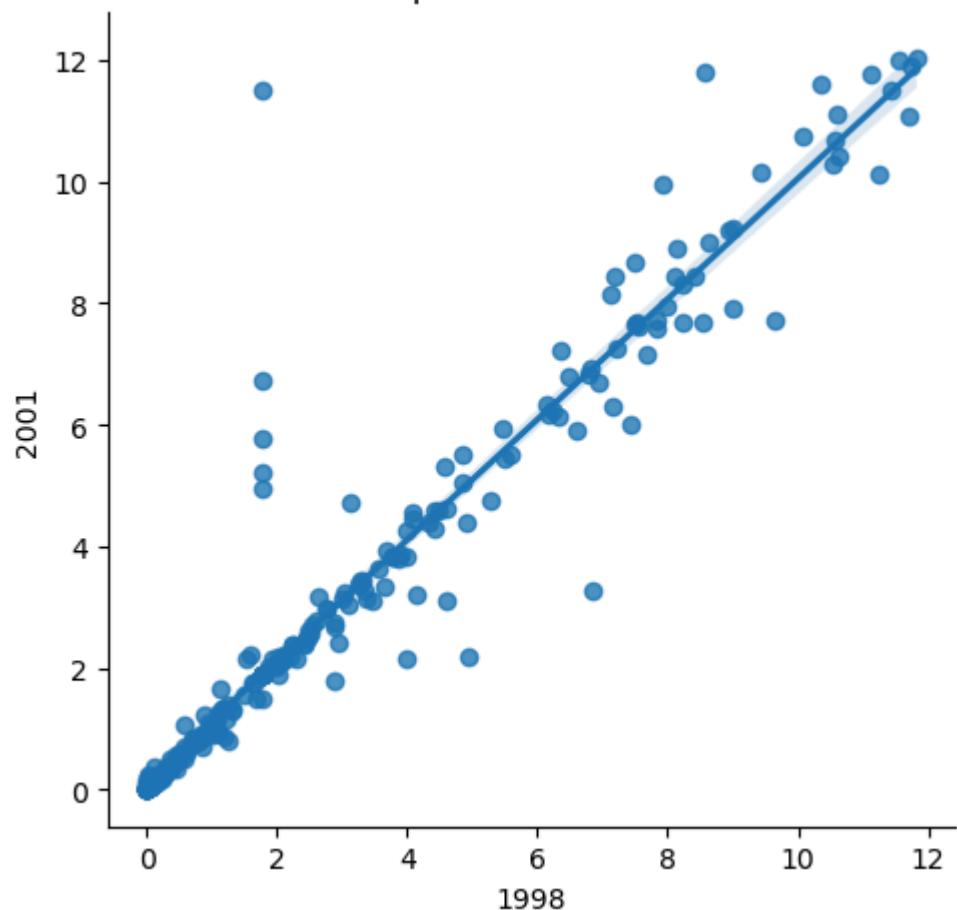
Scaterplot of 1998 vs 2000



Corelation between 1998 and 2000 : 0.9612709076328386

Corelation: Positively Corelated.

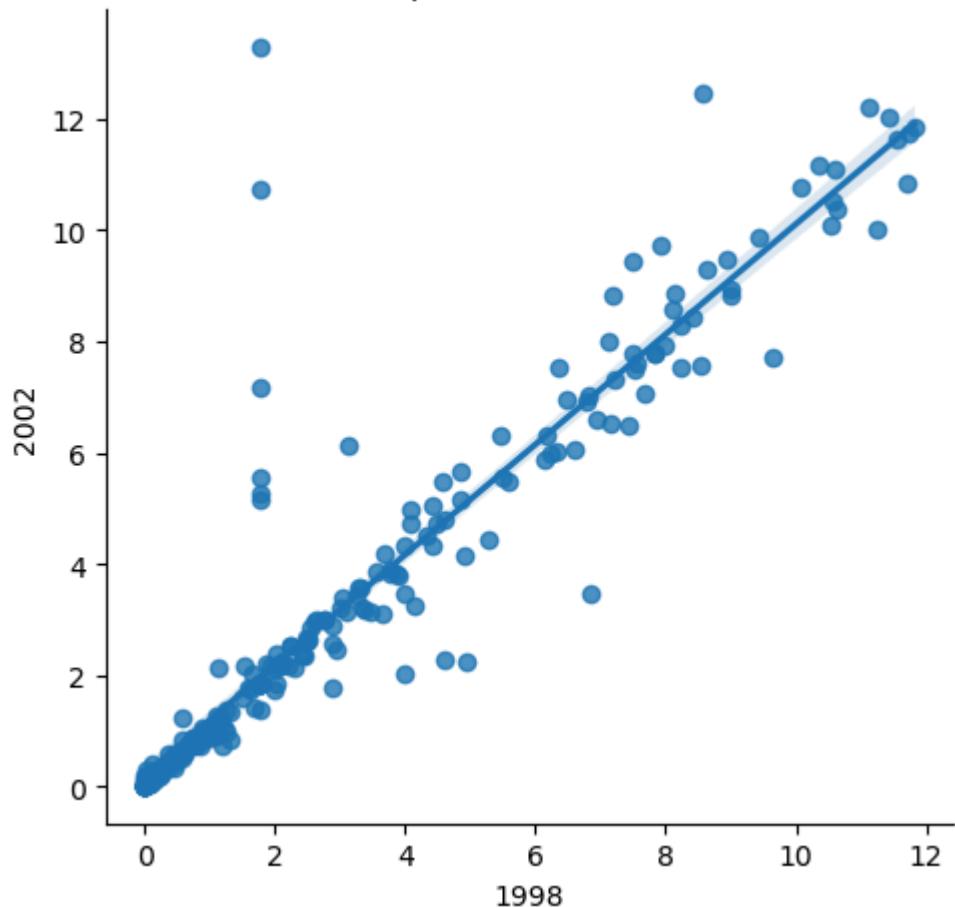
Scaterplot of 1998 vs 2001



Corelation between 1998 and 2001 : 0.959470651988528

Corelation: Positively Corelated.

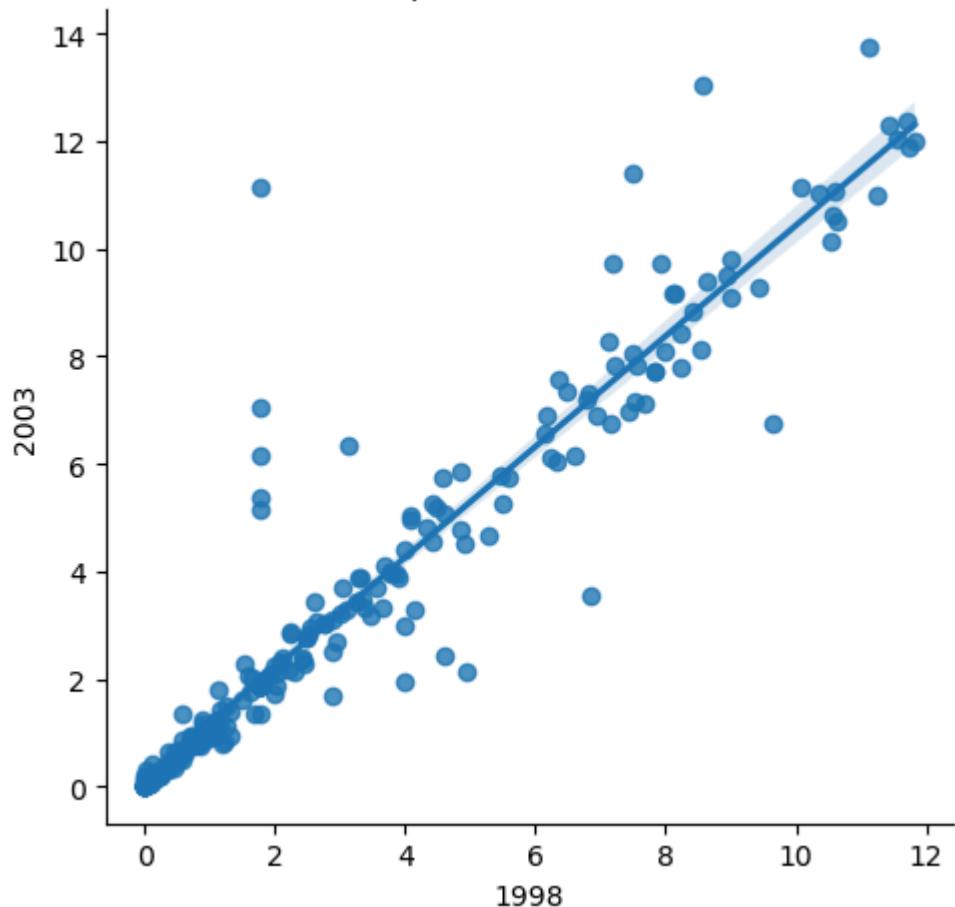
Scaterplot of 1998 vs 2002



Corelation between 1998 and 2002 : 0.9368001101122485

Corelation: Positively Corelated.

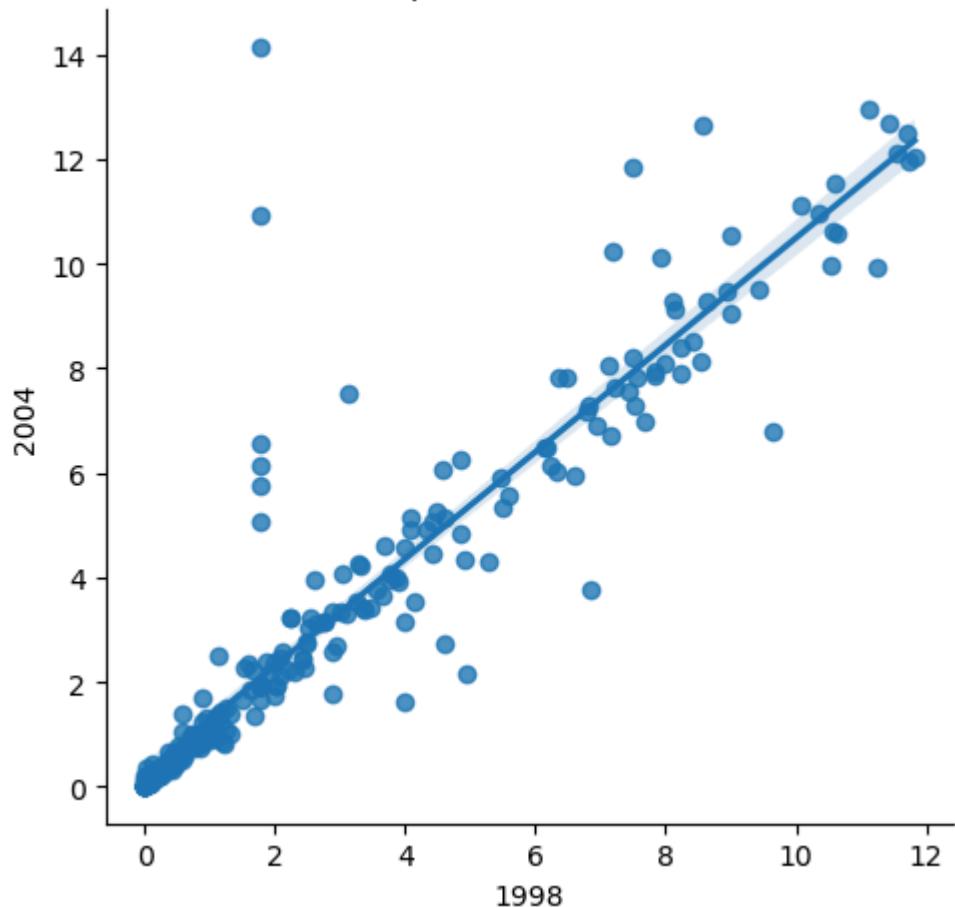
Scaterplot of 1998 vs 2003



Corelation between 1998 and 2003 : 0.9547093198470449

Corelation: Positively Corelated.

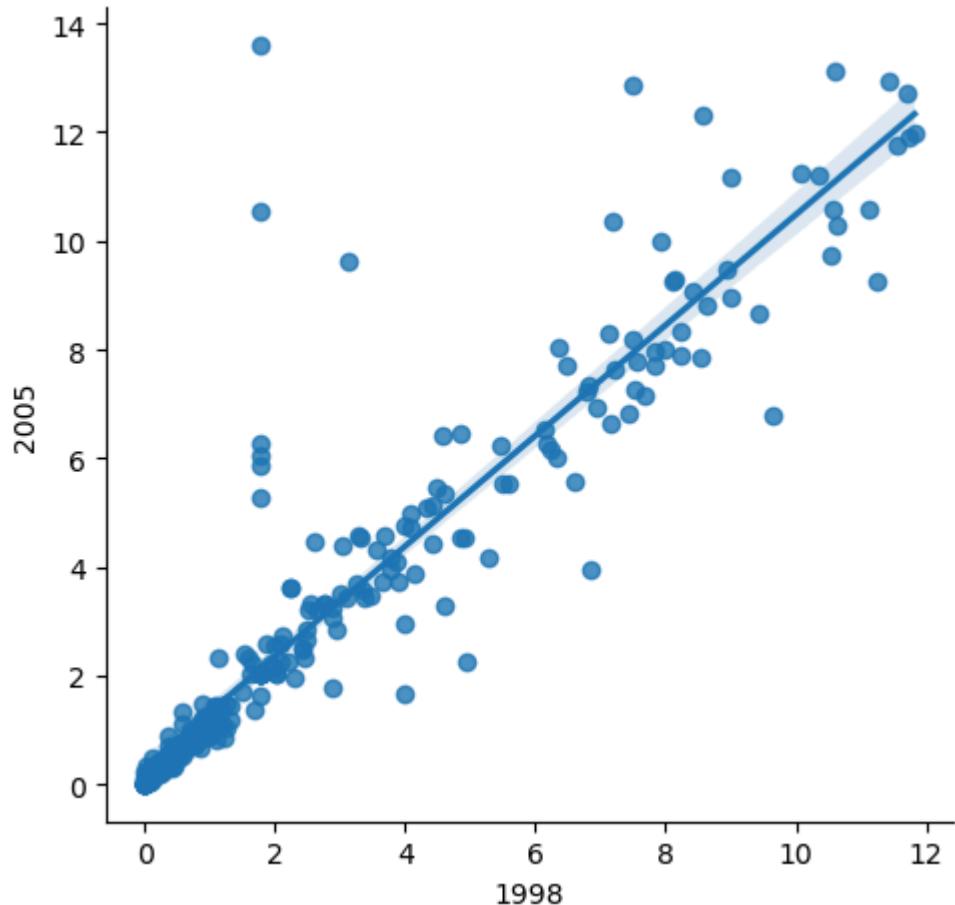
Scaterplot of 1998 vs 2004



Corelation between 1998 and 2004 : 0.9304145936216691

Corelation: Positively Corelated.

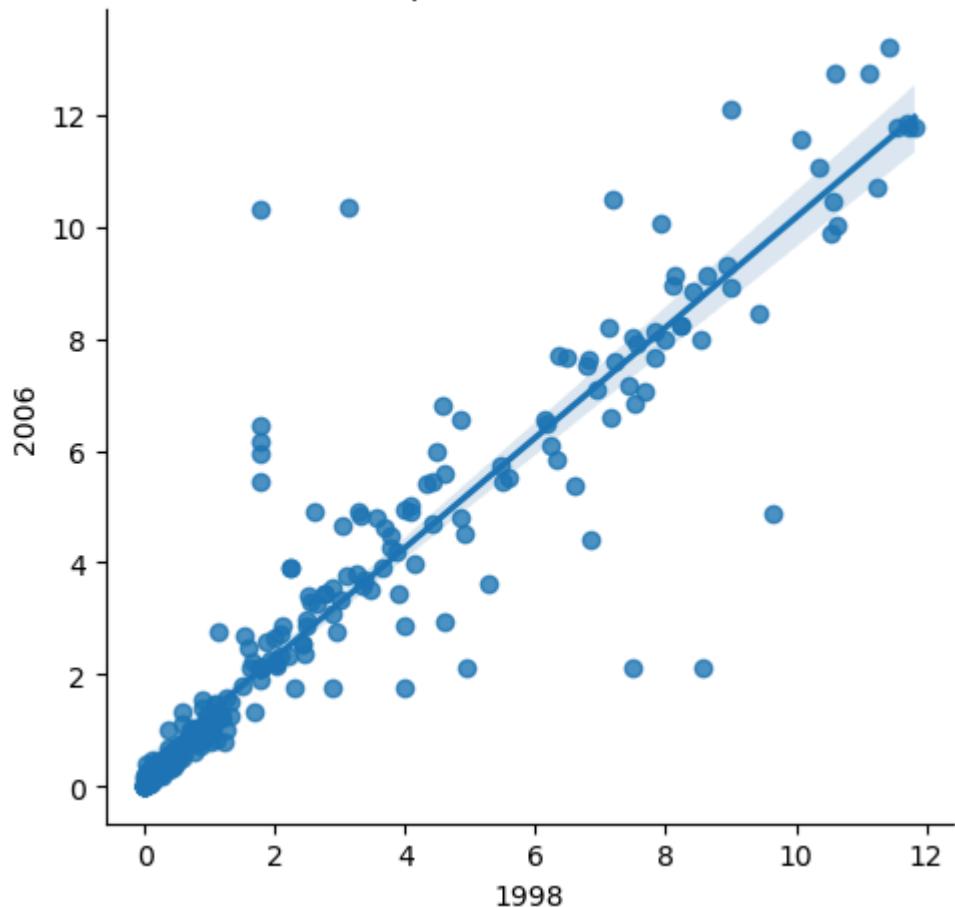
Scaterplot of 1998 vs 2005



Corelation between 1998 and 2005 : 0.9263465888218589

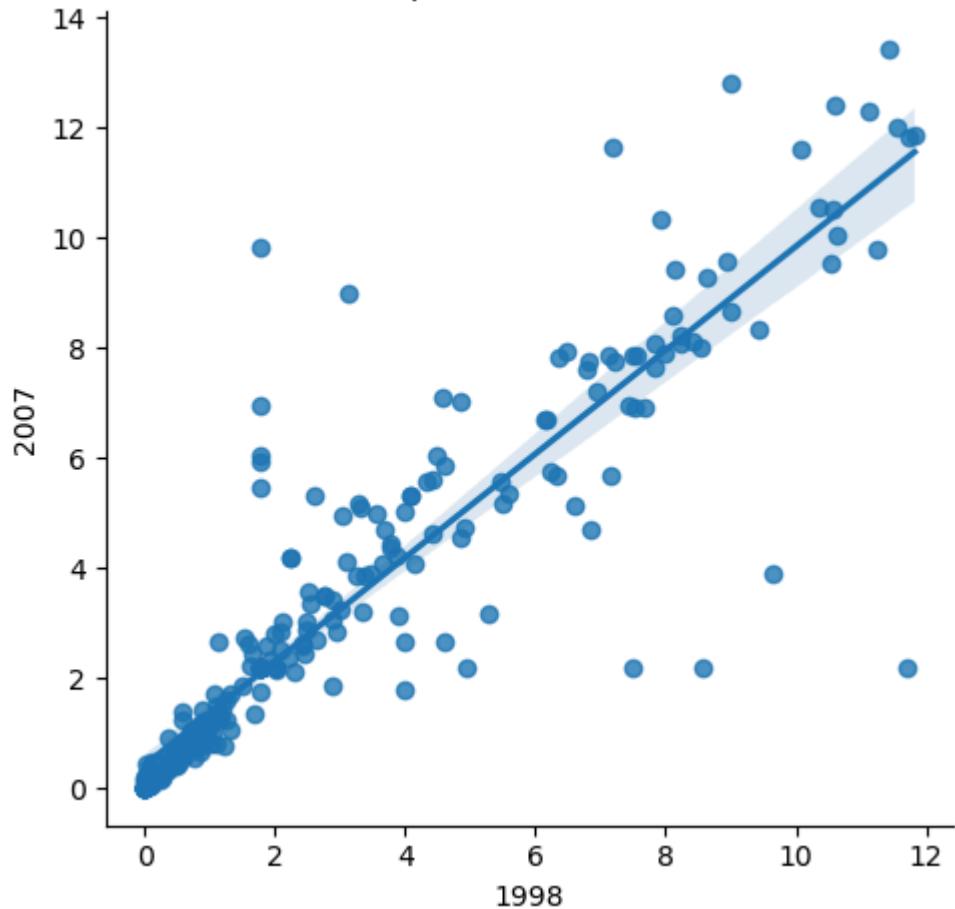
Corelation: Positively Corelated.

Scaterplot of 1998 vs 2006



Corelation between 1998 and 2006 : 0.9298900540677175

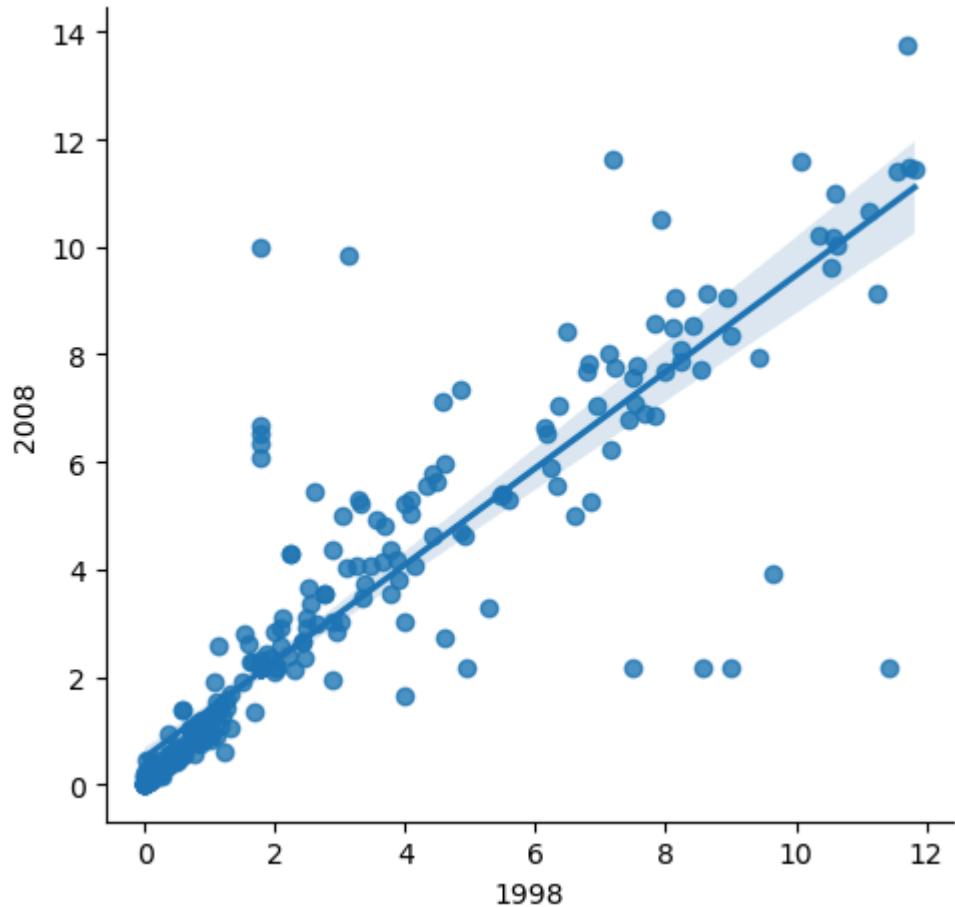
Corelation: Positively Corelated.

Scaterplot of 1998 vs 2007

Corelation between 1998 and 2007 : 0.9059137879746041

Corelation: Positively Corelated.

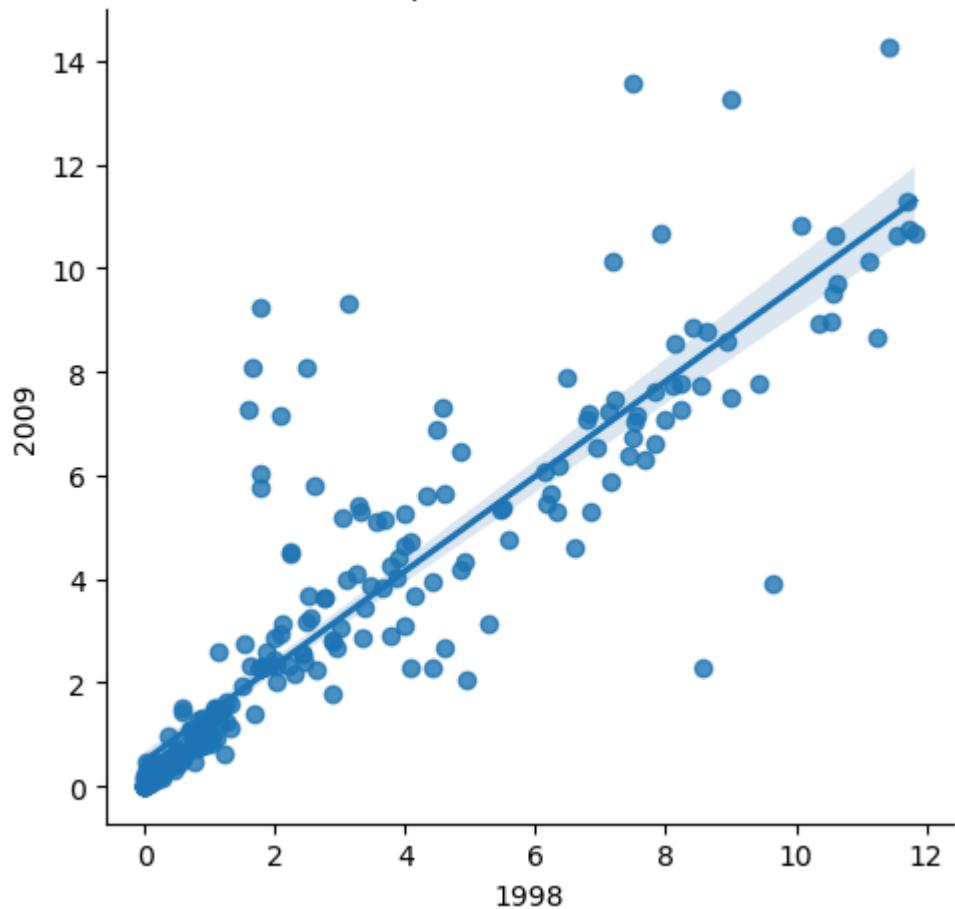
Scaterplot of 1998 vs 2008



Corelation between 1998 and 2008 : 0.8912513339876615

Corelation: Positively Corelated.

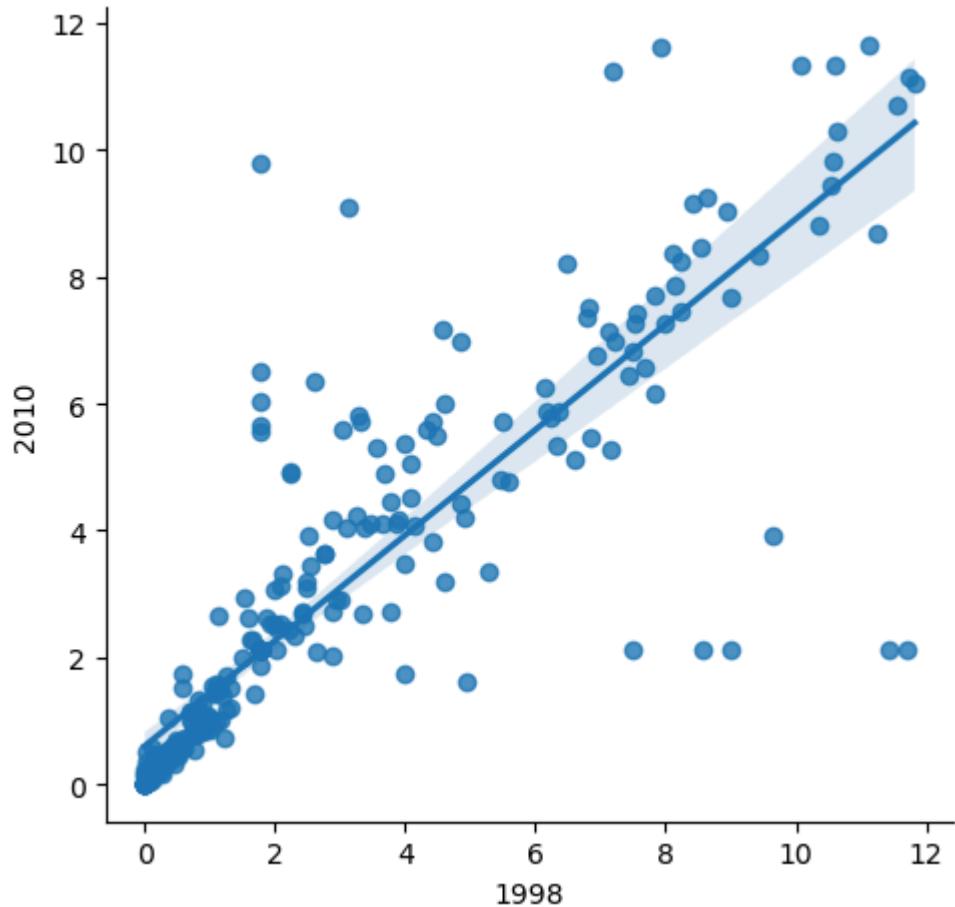
Scaterplot of 1998 vs 2009



Corelation between 1998 and 2009 : 0.8990956142284297

Corelation: Positively Corelated.

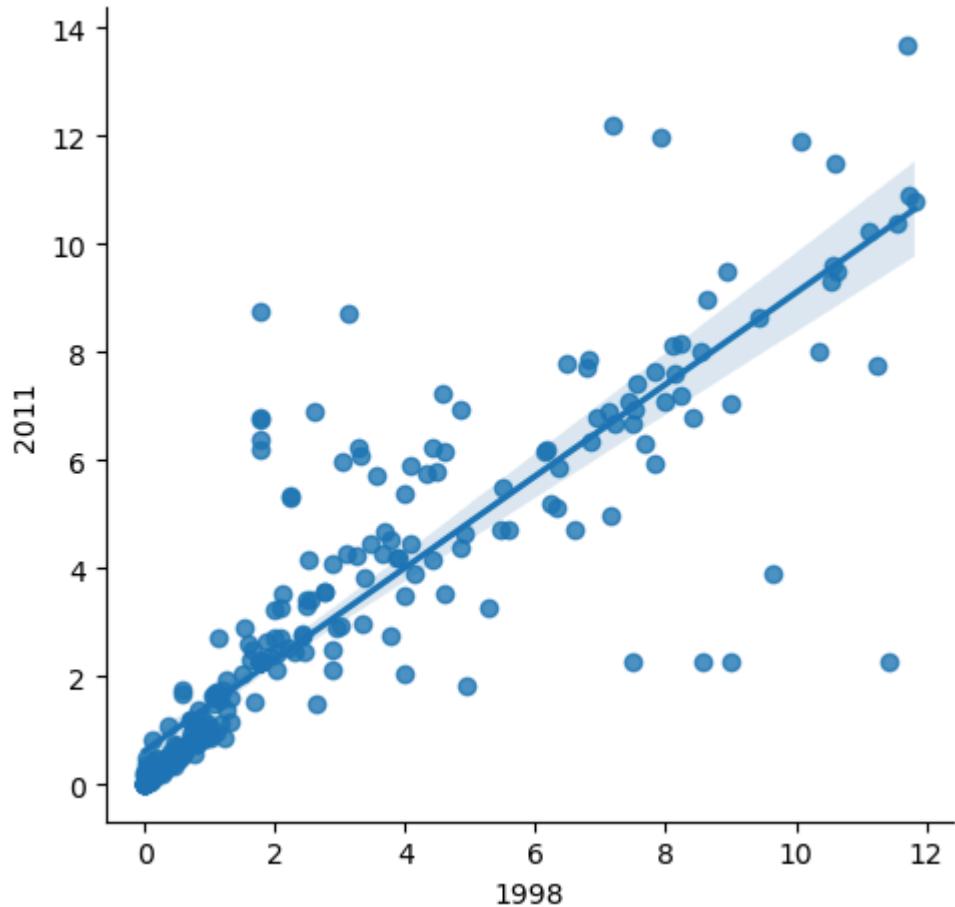
Scaterplot of 1998 vs 2010



Corelation between 1998 and 2010 : 0.8654351920277252

Corelation: Positively Corelated.

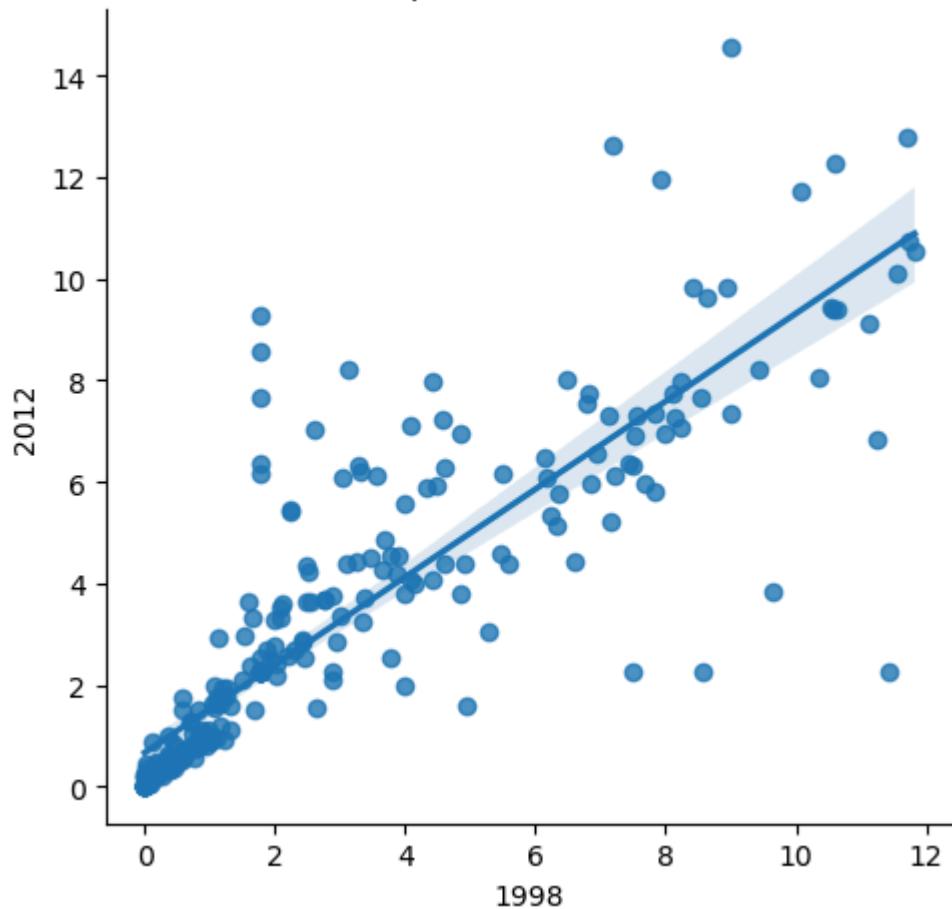
Scaterplot of 1998 vs 2011



Corelation between 1998 and 2011 : 0.8739562826012583

Corelation: Positively Corelated.

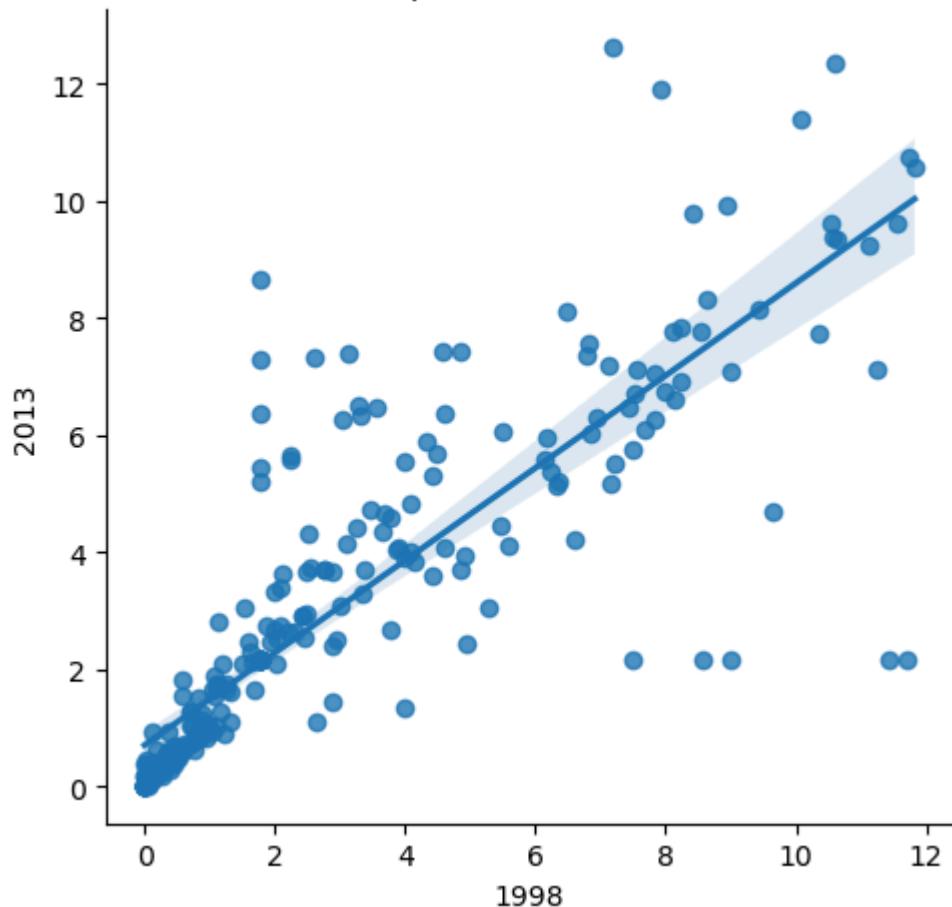
Scaterplot of 1998 vs 2012



Corelation between 1998 and 2012 : 0.863826903364218

Corelation: Positively Corelated.

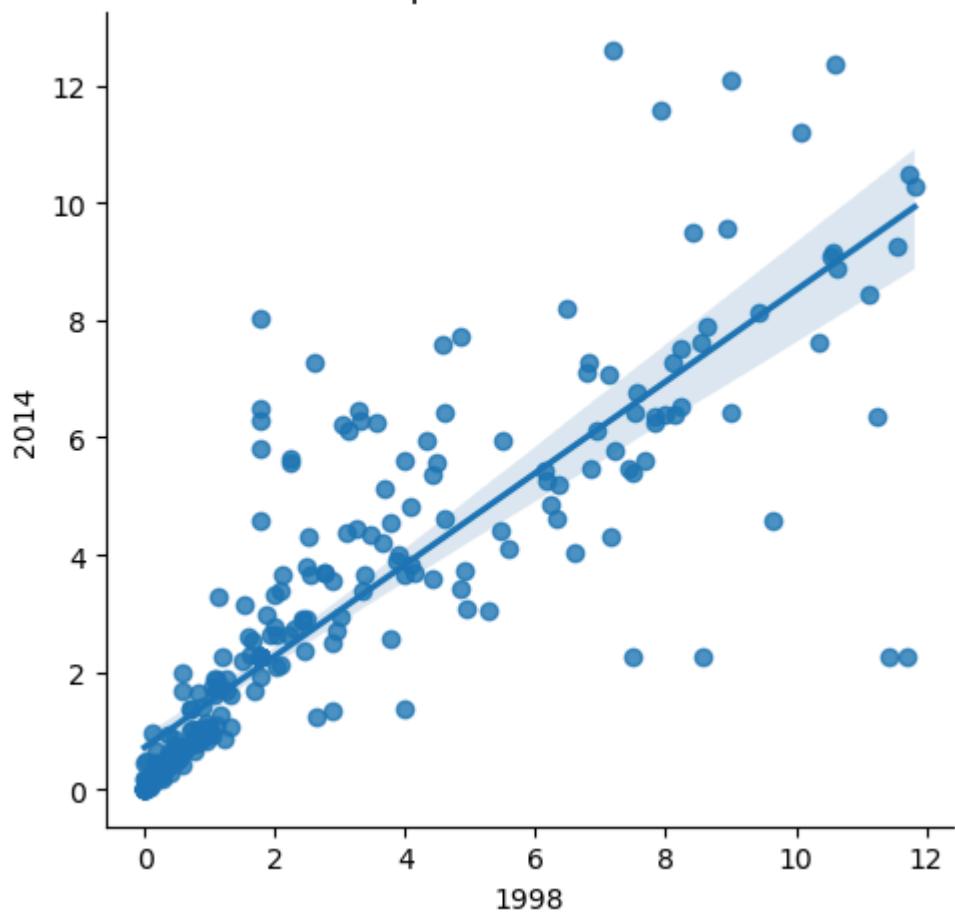
Scaterplot of 1998 vs 2013



Corelation between 1998 and 2013 : 0.8469016328840024

Corelation: Positively Corelated.

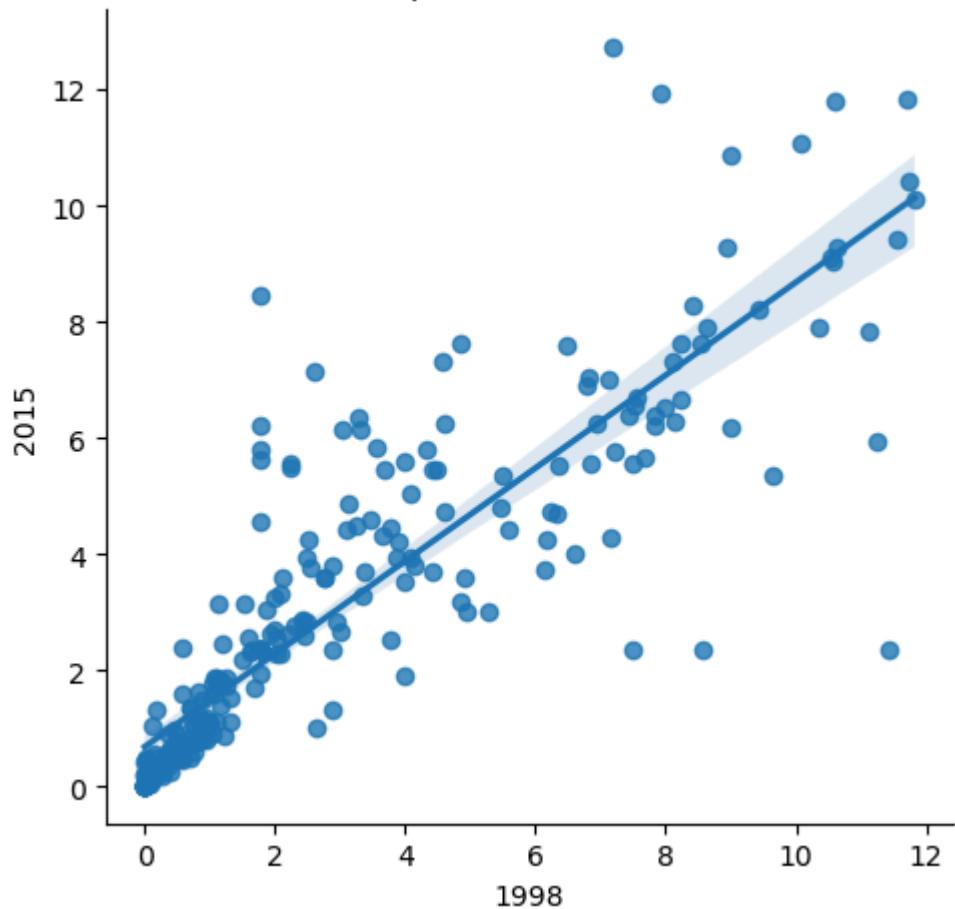
Scaterplot of 1998 vs 2014



Corelation between 1998 and 2014 : 0.850560727301775

Corelation: Positively Corelated.

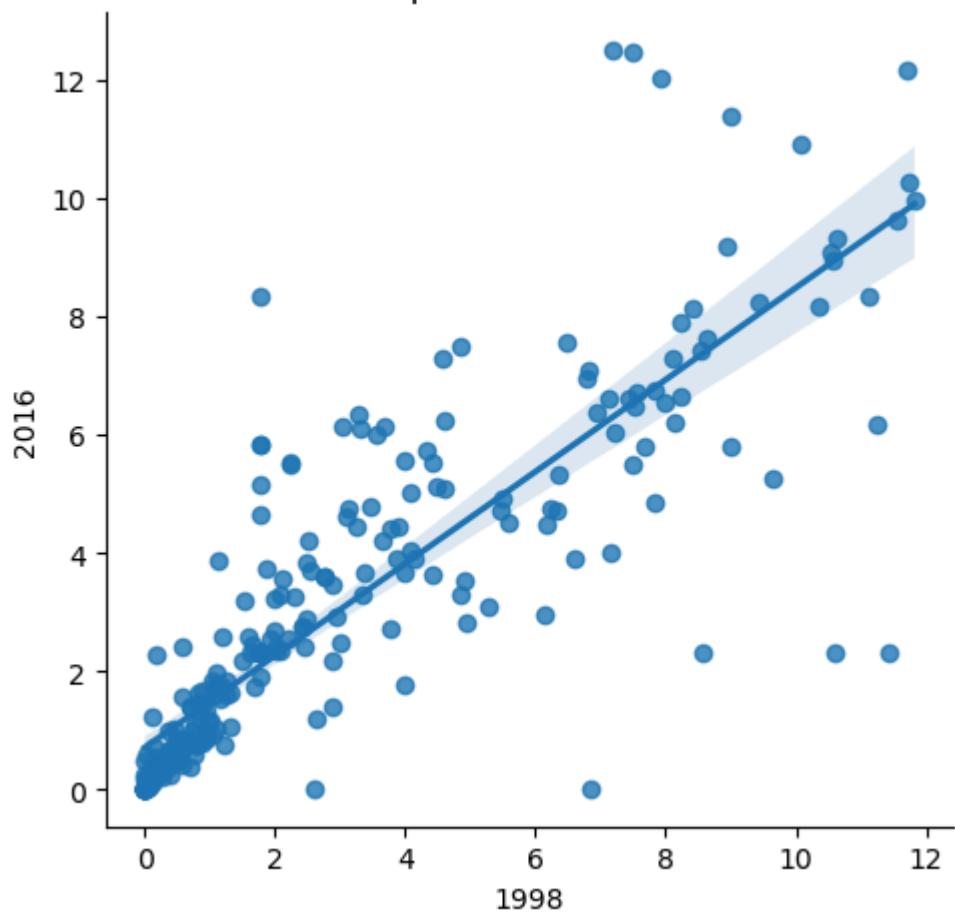
Scaterplot of 1998 vs 2015



Corelation between 1998 and 2015 : 0.873551170551972

Corelation: Positively Corelated.

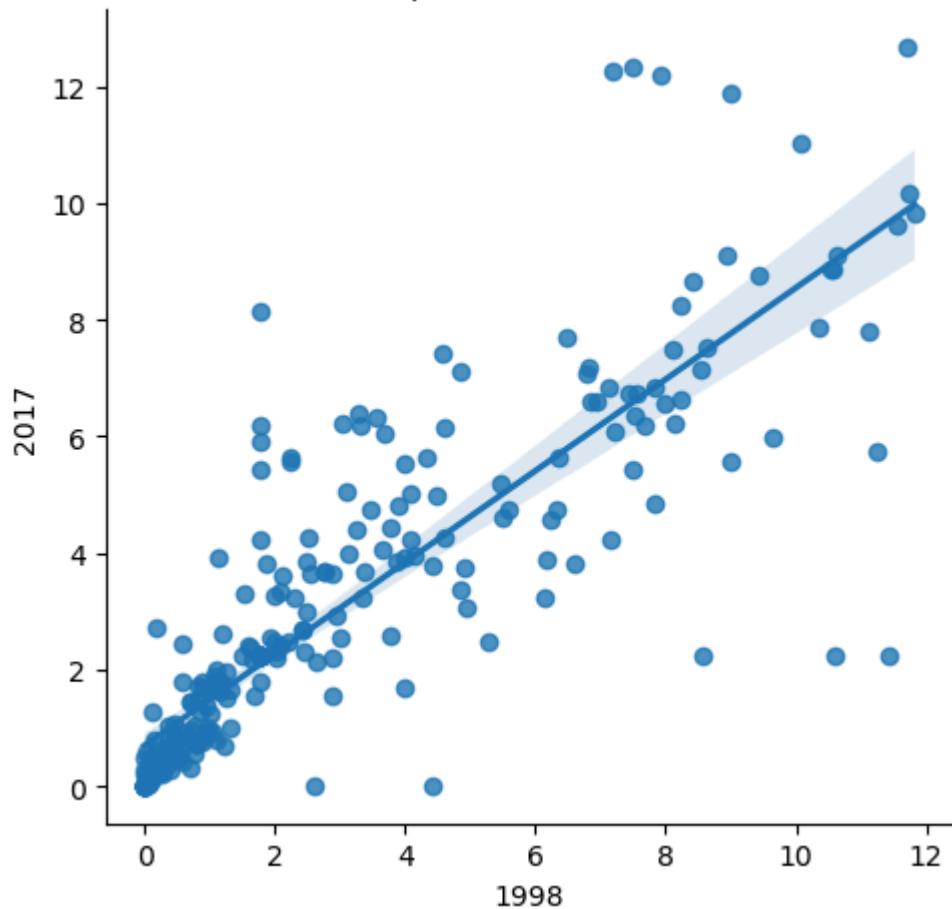
Scaterplot of 1998 vs 2016



Corelation between 1998 and 2016 : 0.8504985609751328

Corelation: Positively Corelated.

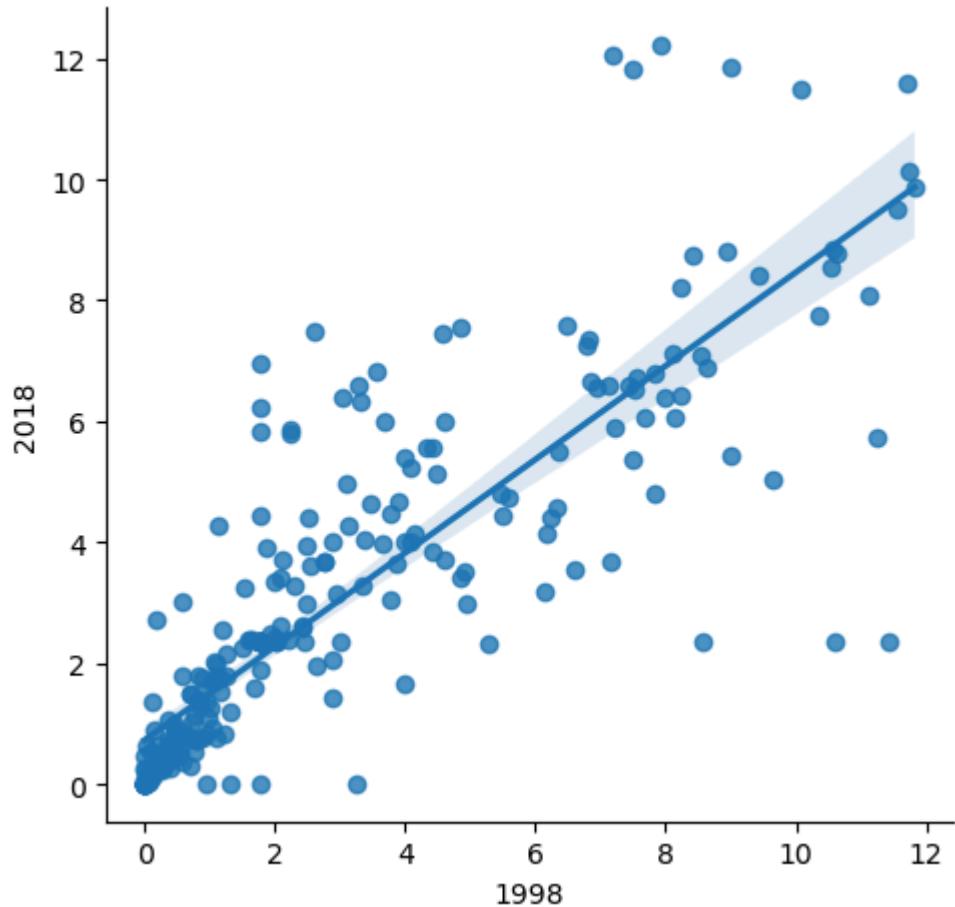
Scaterplot of 1998 vs 2017



Corelation between 1998 and 2017 : 0.8531600534896161

Corelation: Positively Corelated.

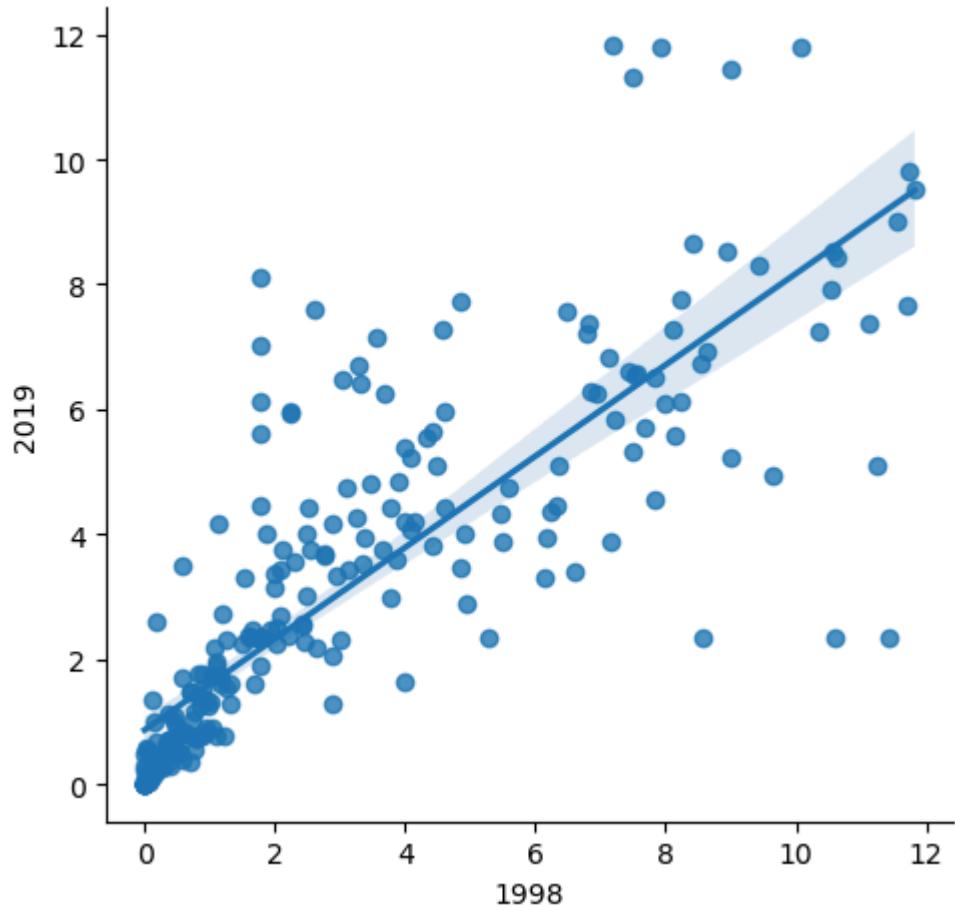
Scaterplot of 1998 vs 2018



Corelation between 1998 and 2018 : 0.8481225404789328

Corelation: Positively Corelated.

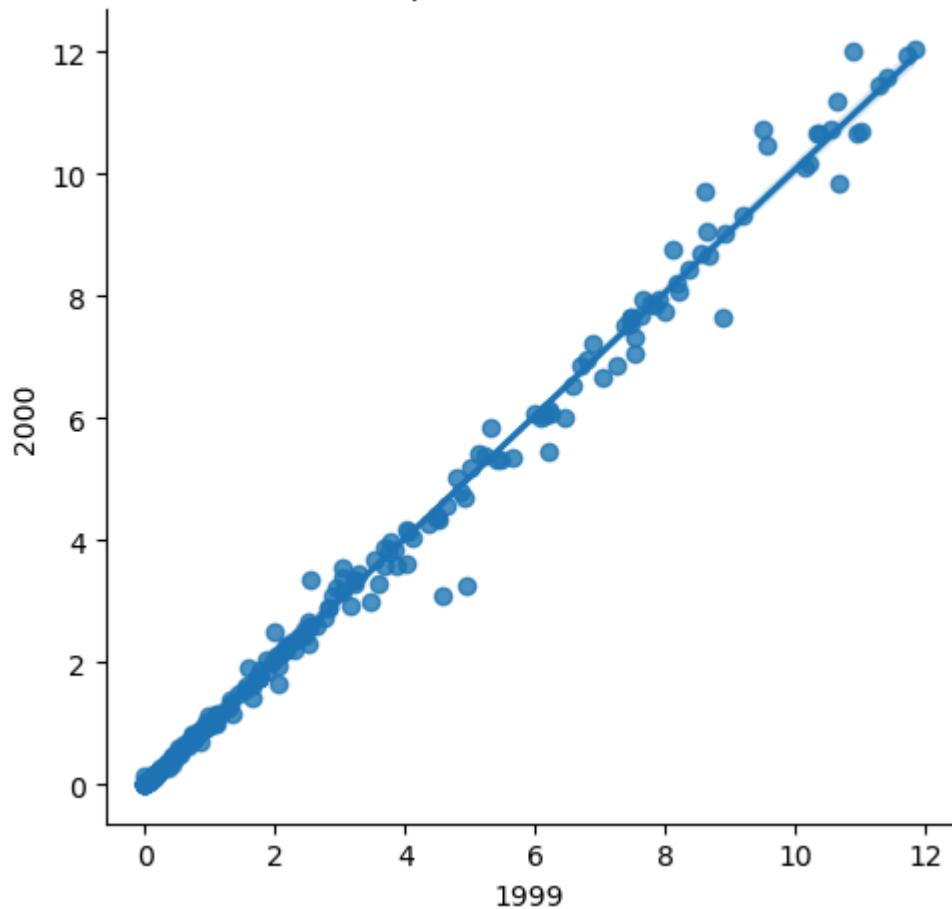
Scaterplot of 1998 vs 2019



Corelation between 1998 and 2019 : 0.8291088086897206

Corelation: Positively Corelated.

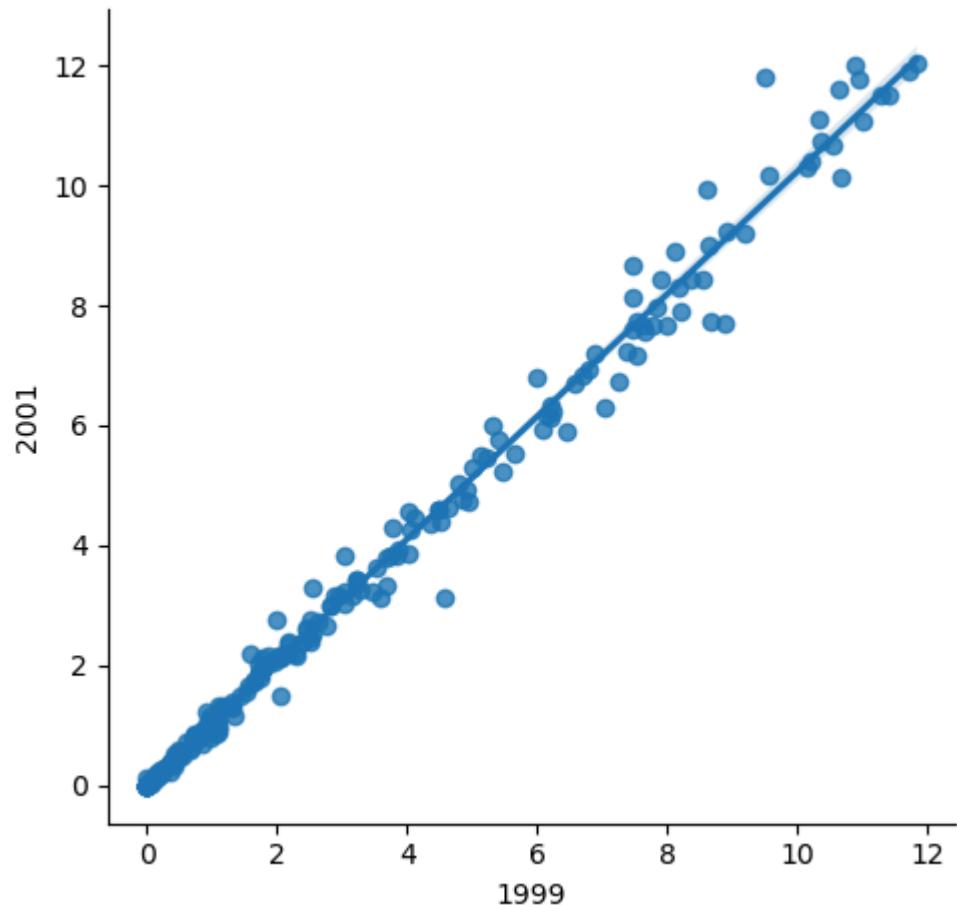
Scaterplot of 1999 vs 2000



Corelation between 1999 and 2000 : 0.9965695302246962

Corelation: Positively Corelated.

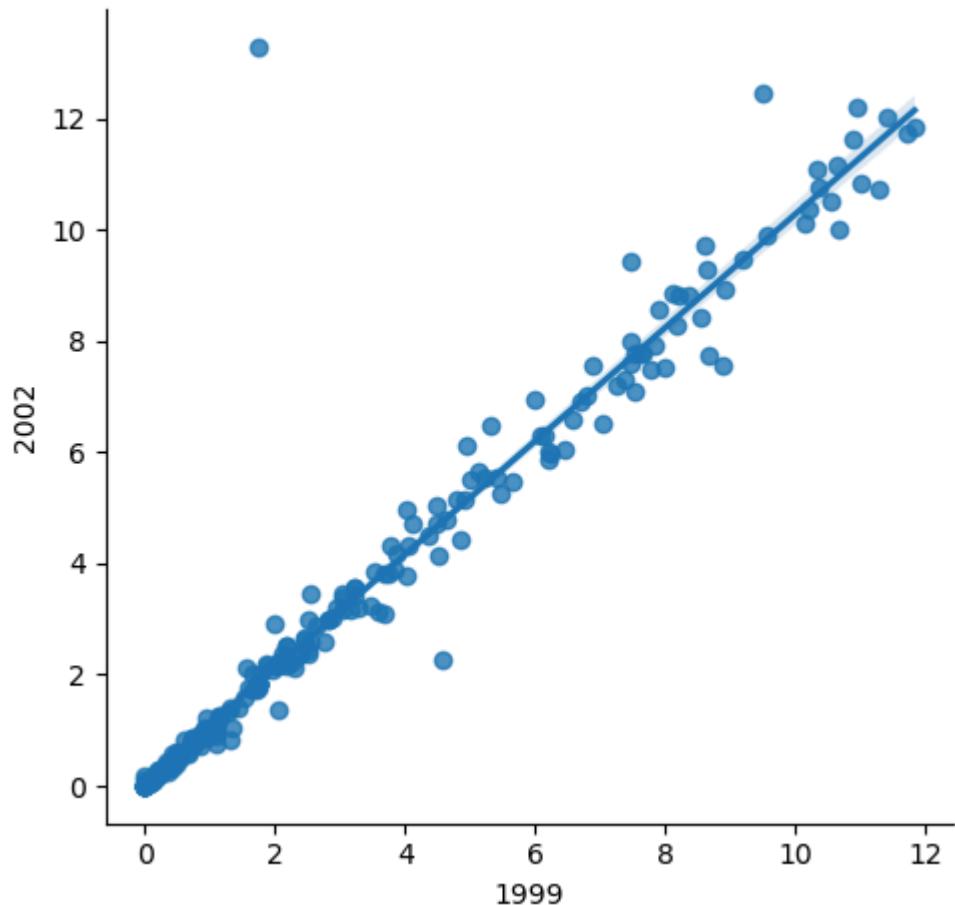
Scaterplot of 1999 vs 2001



Corelation between 1999 and 2001 : 0.9955348041704254

Corelation: Positively Corelated.

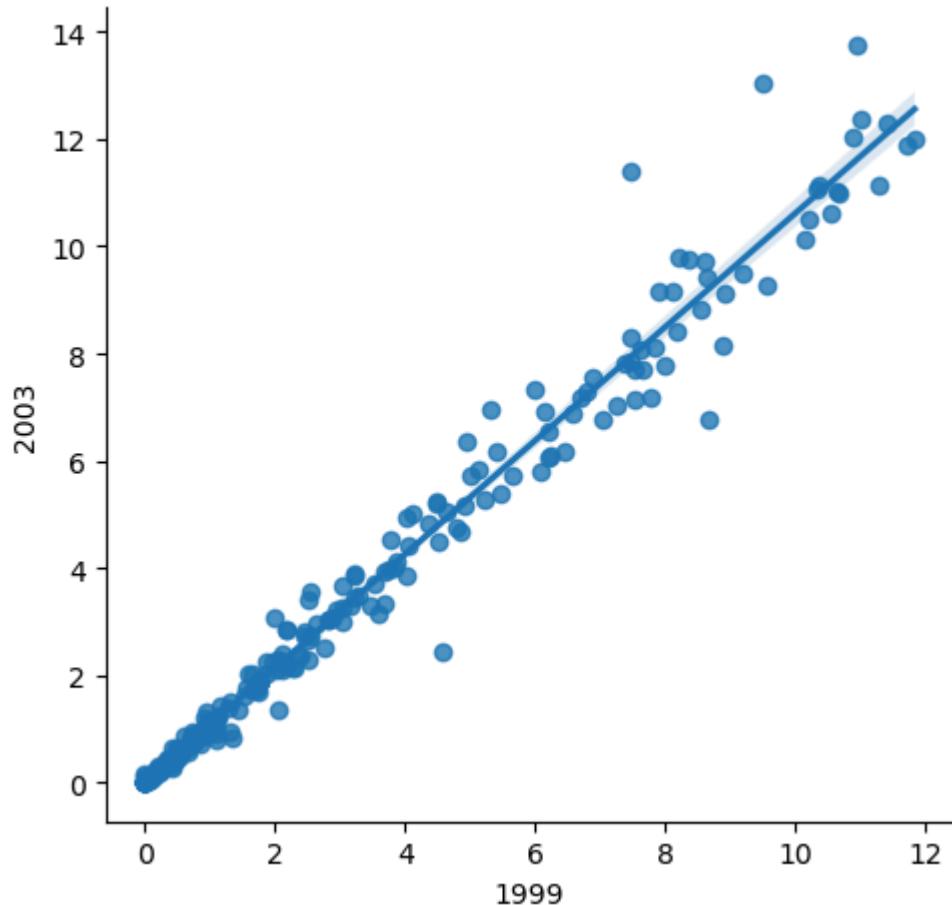
Scaterplot of 1999 vs 2002



Corelation between 1999 and 2002 : 0.9707907370022048

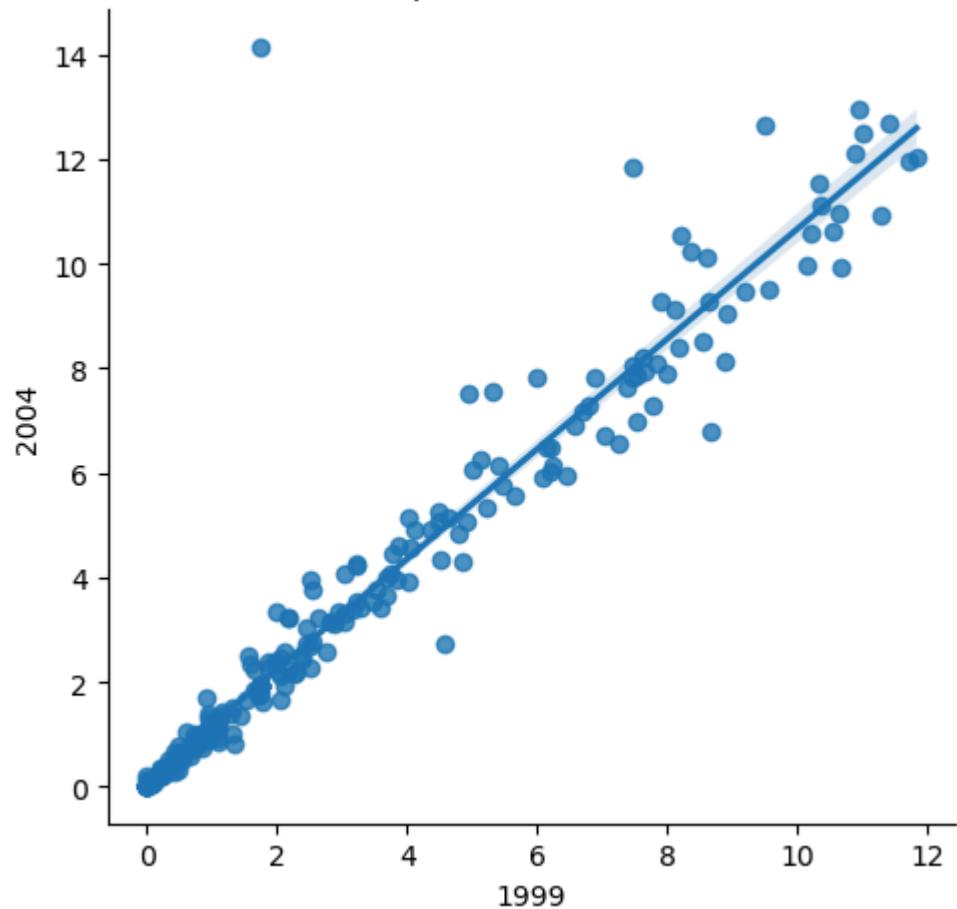
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2003



Corelation between 1999 and 2003 : 0.9891877713763861

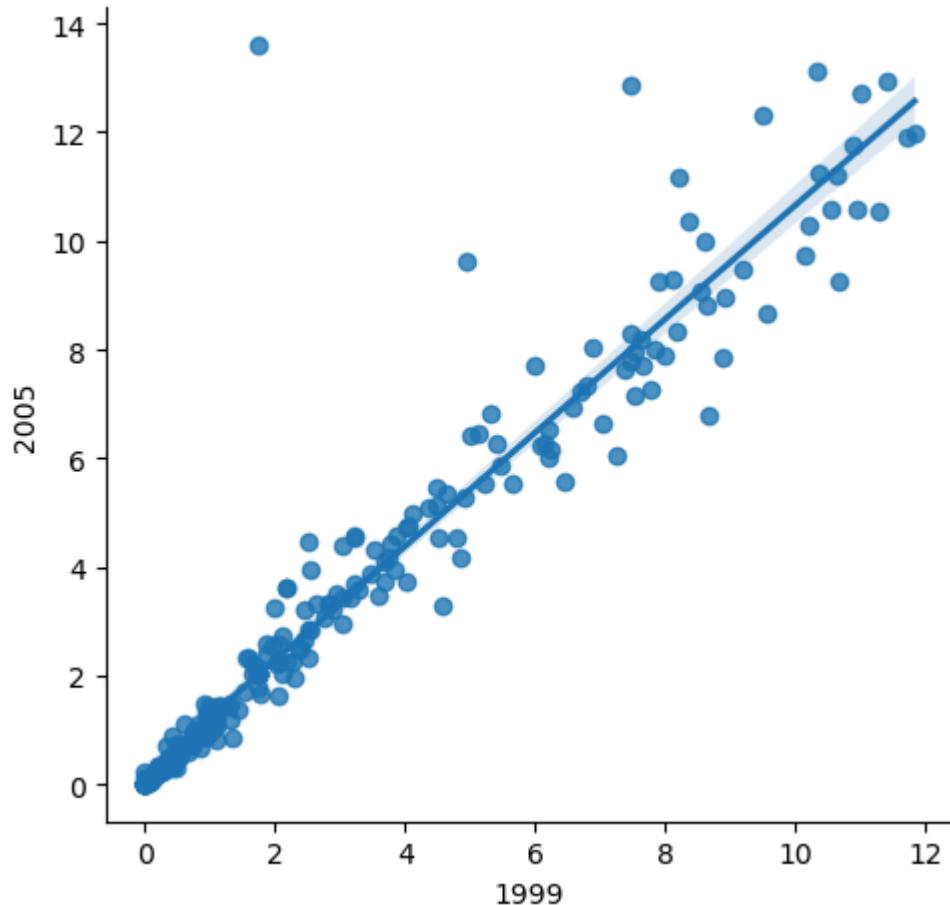
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2004

Corelation between 1999 and 2004 : 0.9629651534394137

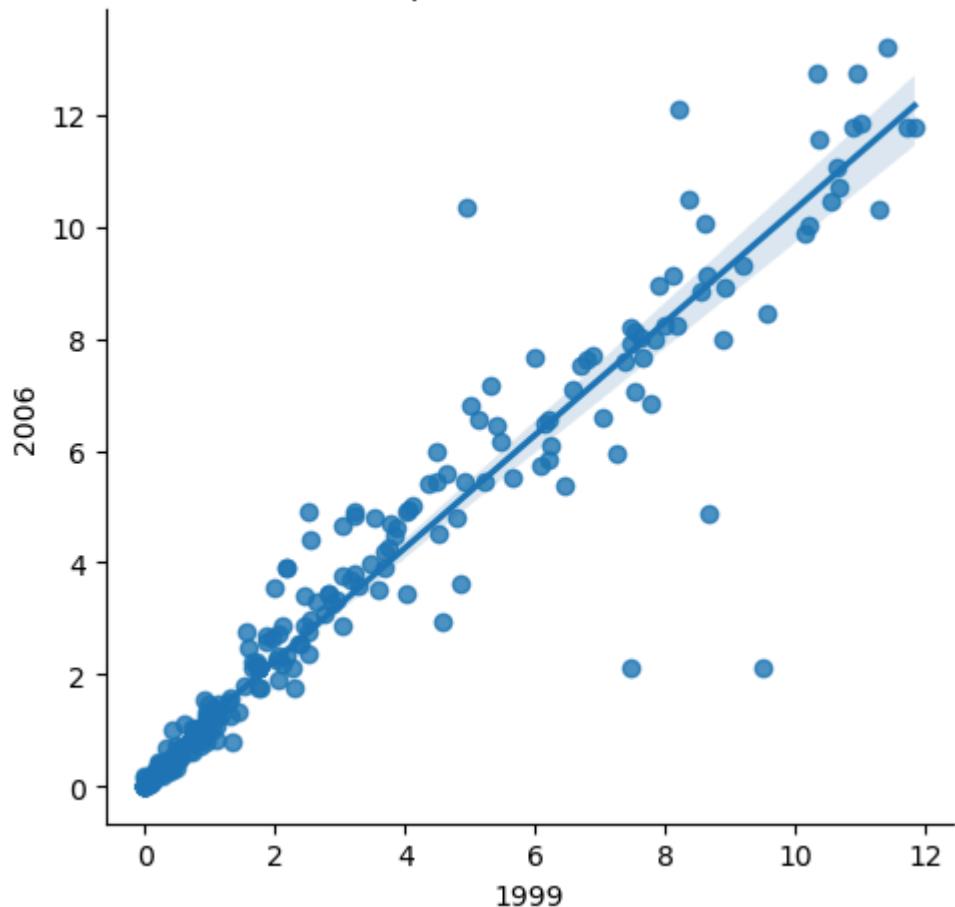
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2005



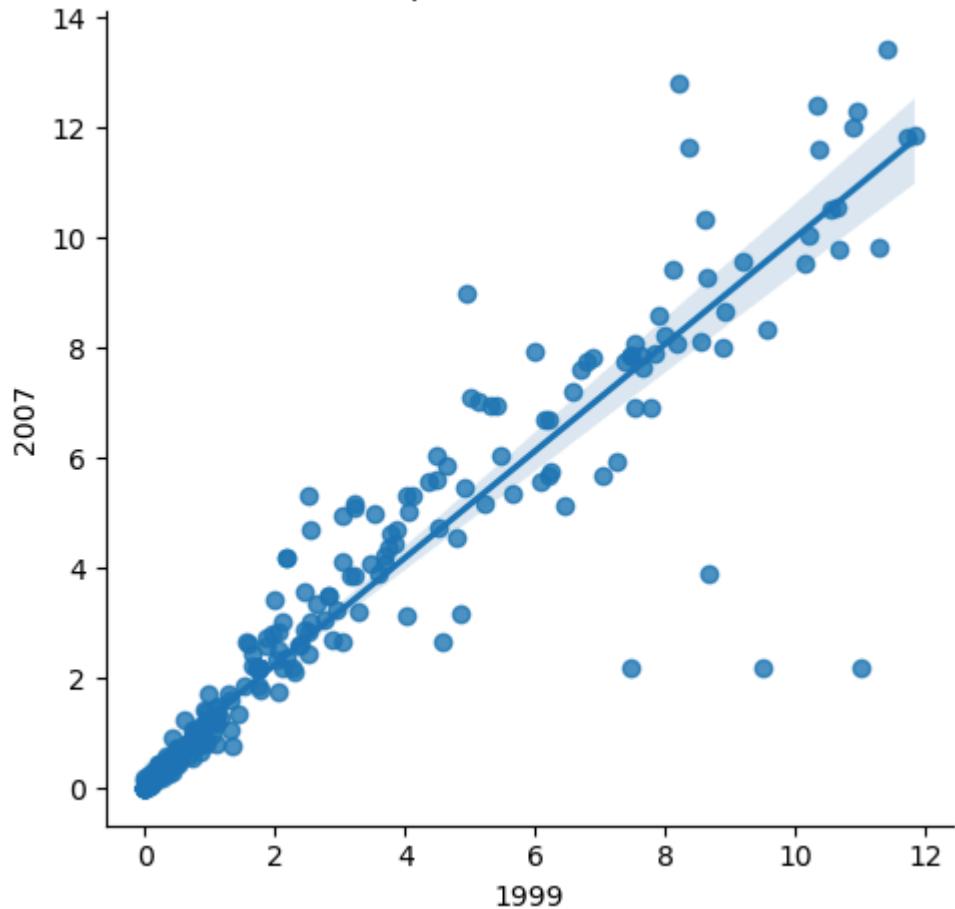
Corelation between 1999 and 2005 : 0.9586047626568639

Corelation: Positively Corelated.

Scaterplot of 1999 vs 2006

Corelation between 1999 and 2006 : 0.9601652029404544

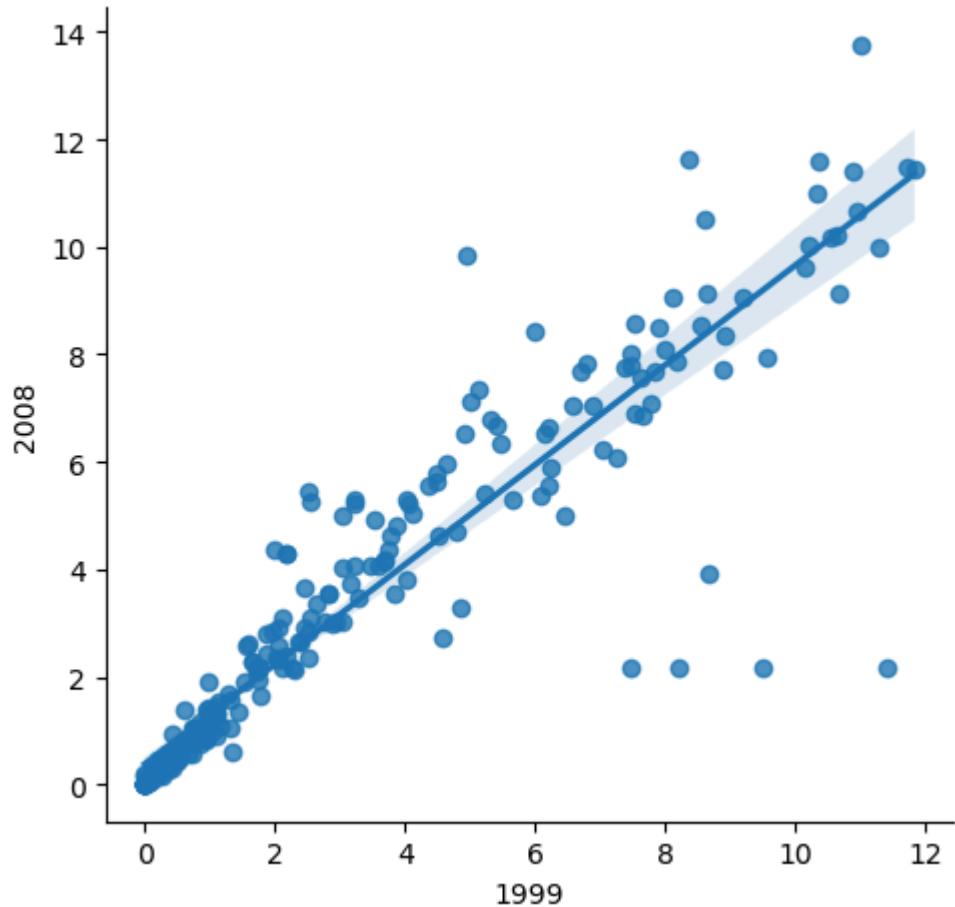
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2007

Corelation between 1999 and 2007 : 0.9381375910289905

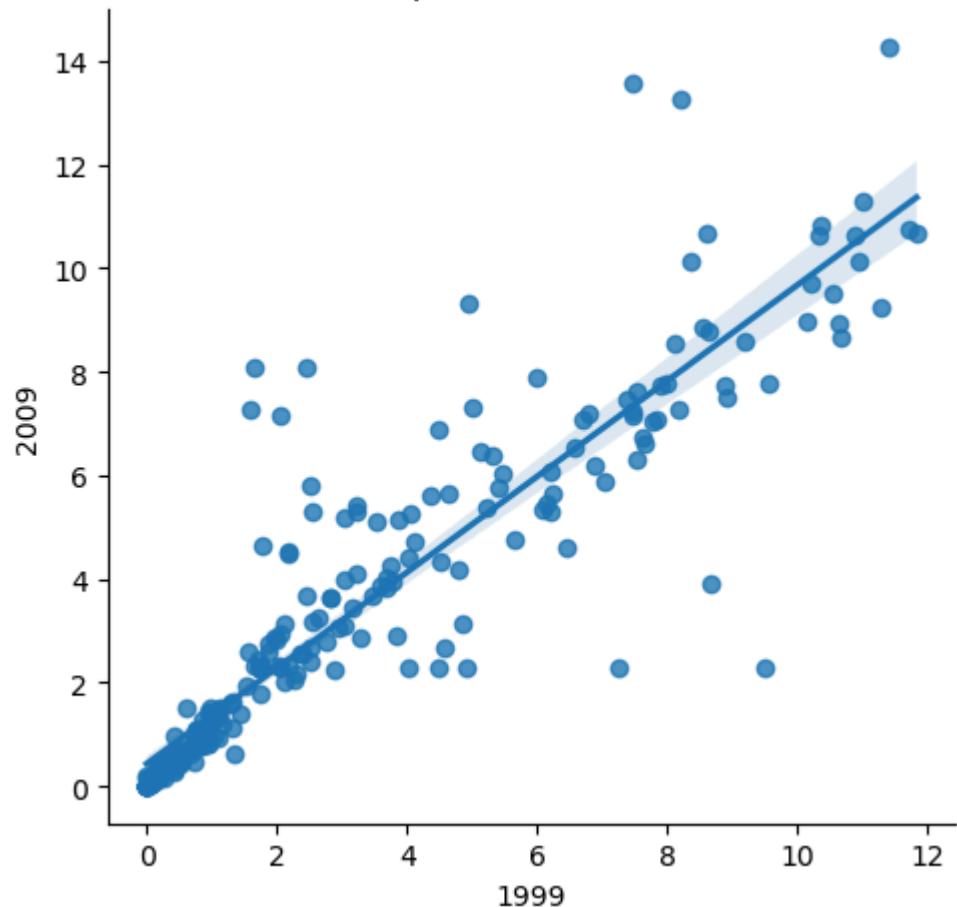
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2008



Corelation between 1999 and 2008 : 0.9270235803361828

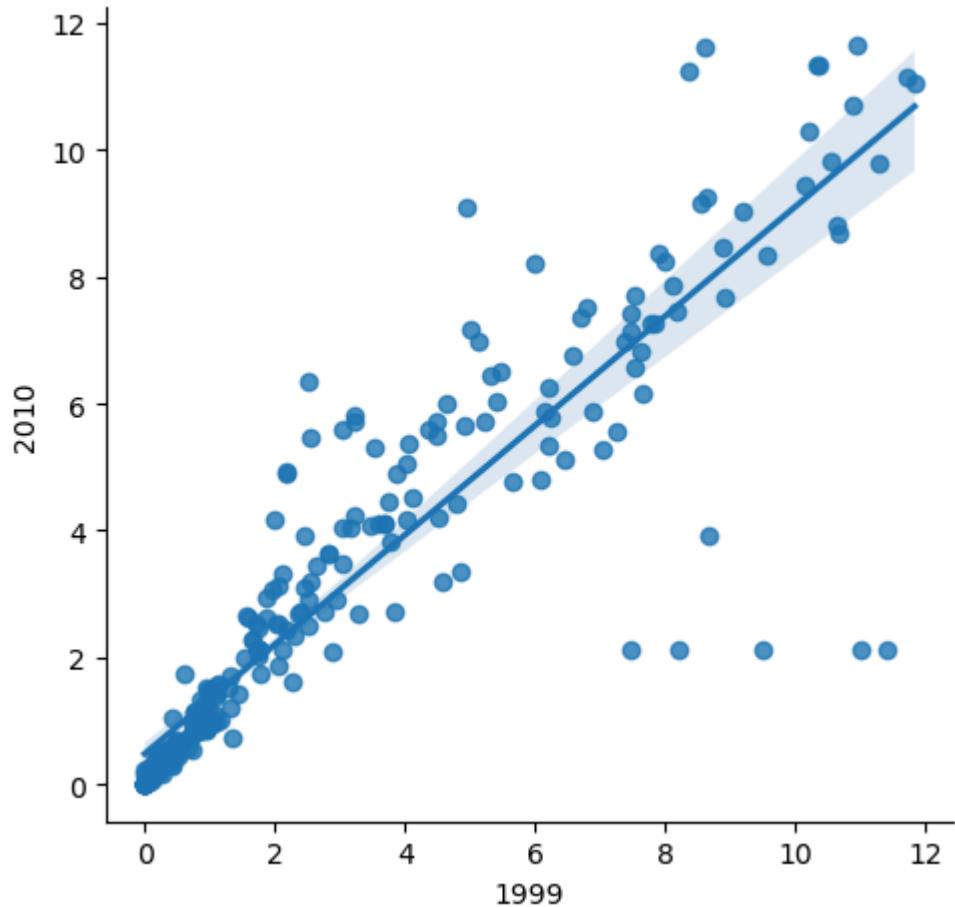
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2009

Corelation between 1999 and 2009 : 0.9128091227144376

Corelation: Positively Corelated.

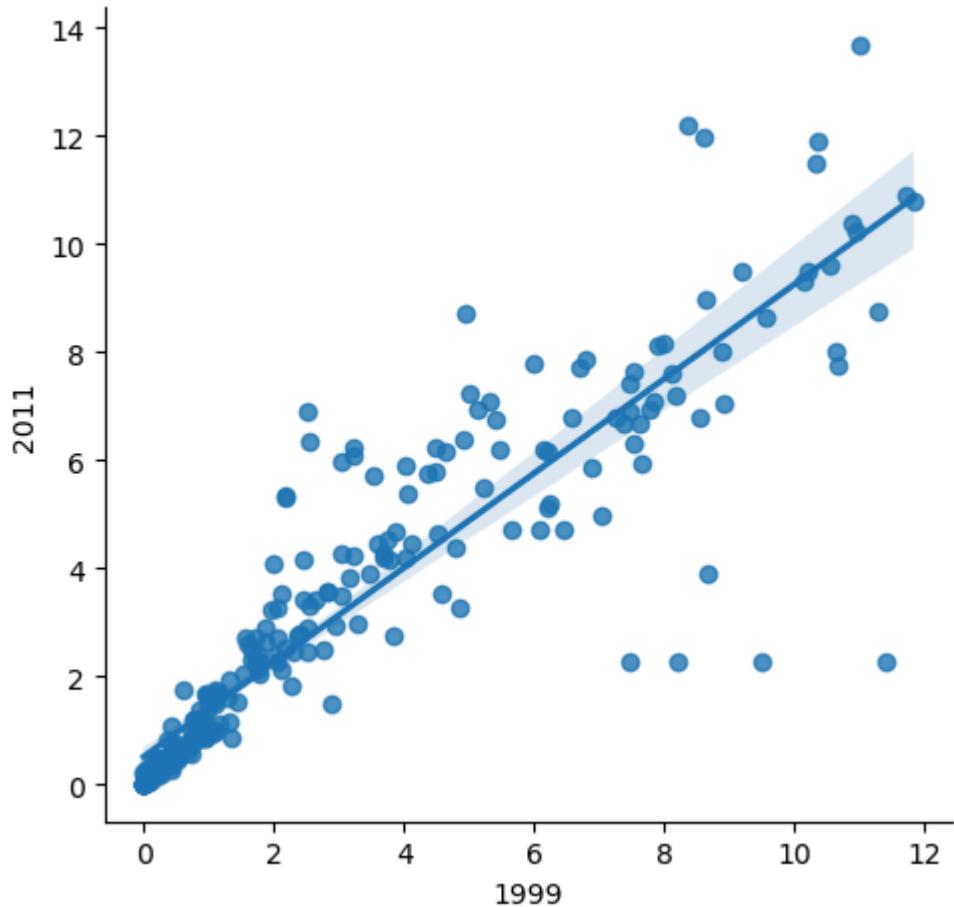
Scaterplot of 1999 vs 2010



Corelation between 1999 and 2010 : 0.9032593609338512

Corelation: Positively Corelated.

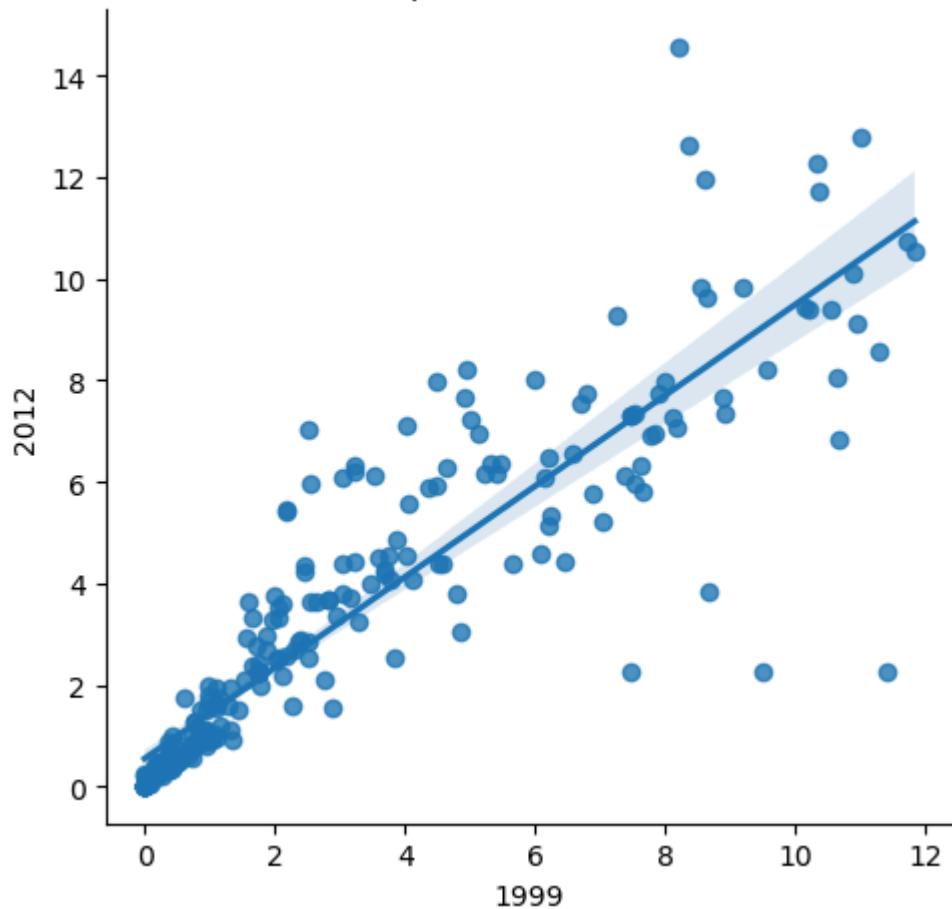
Scaterplot of 1999 vs 2011



Corelation between 1999 and 2011 : 0.9061465171219997

Corelation: Positively Corelated.

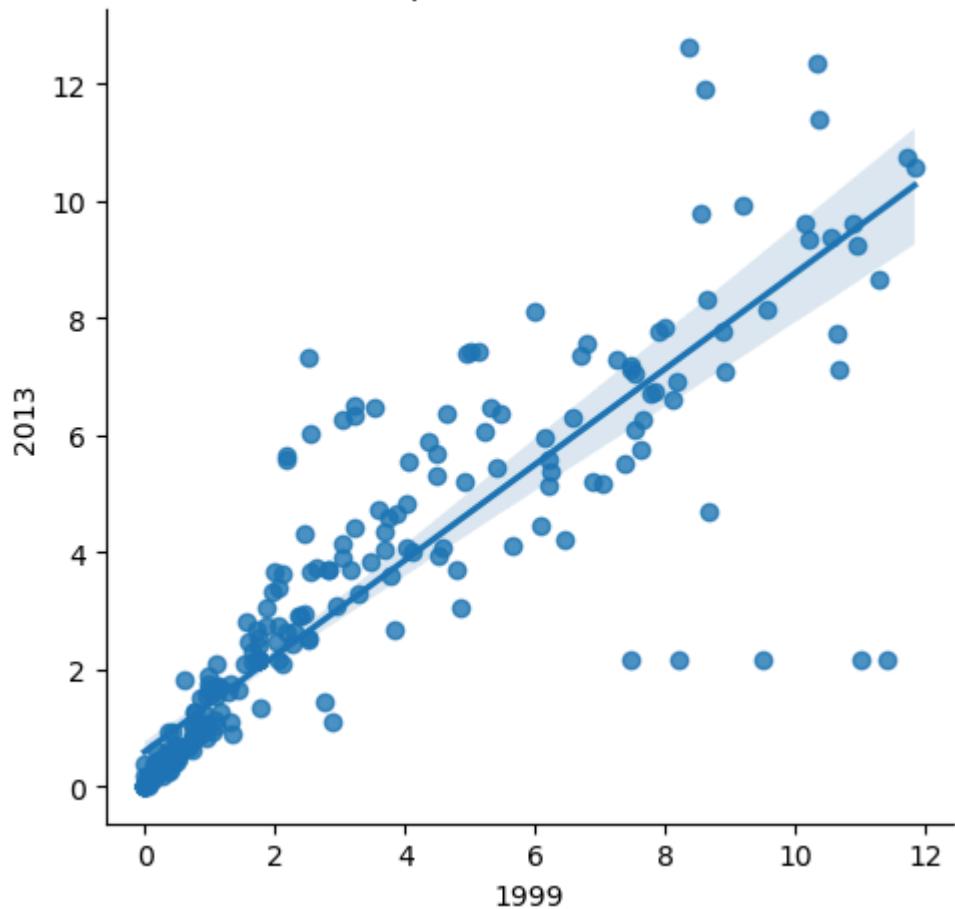
Scaterplot of 1999 vs 2012



Corelation between 1999 and 2012 : 0.8983439558157613

Corelation: Positively Corelated.

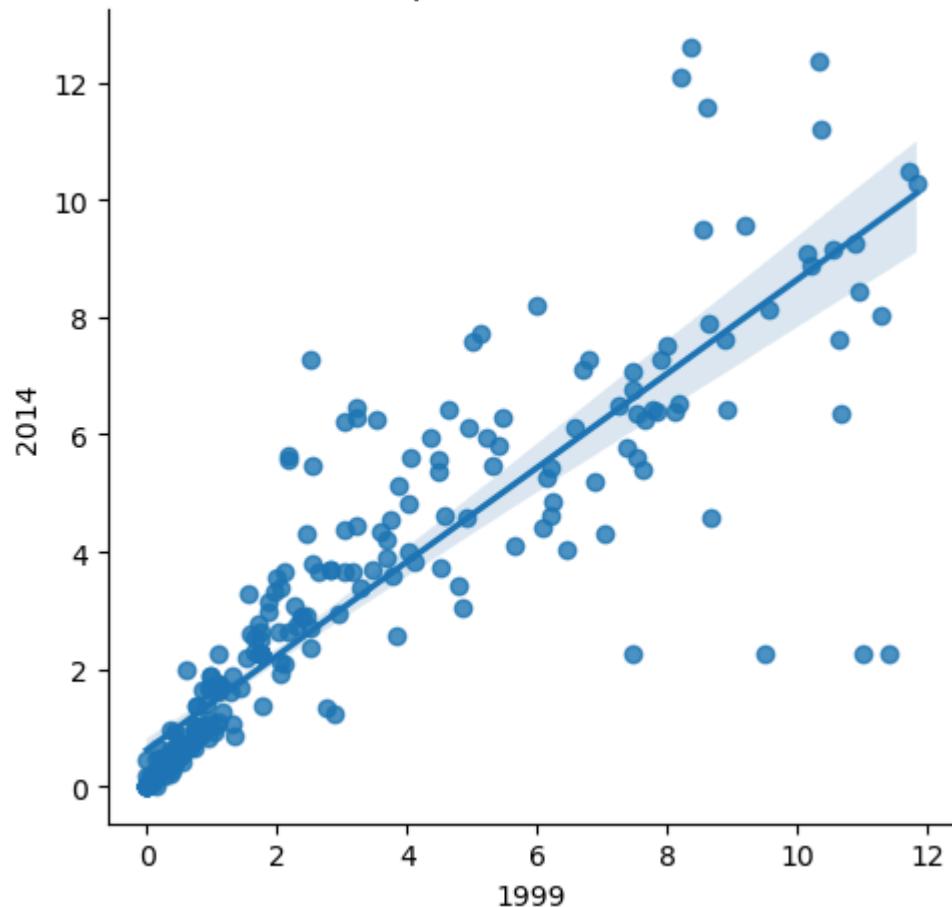
Scaterplot of 1999 vs 2013



Corelation between 1999 and 2013 : 0.8823775026715387

Corelation: Positively Corelated.

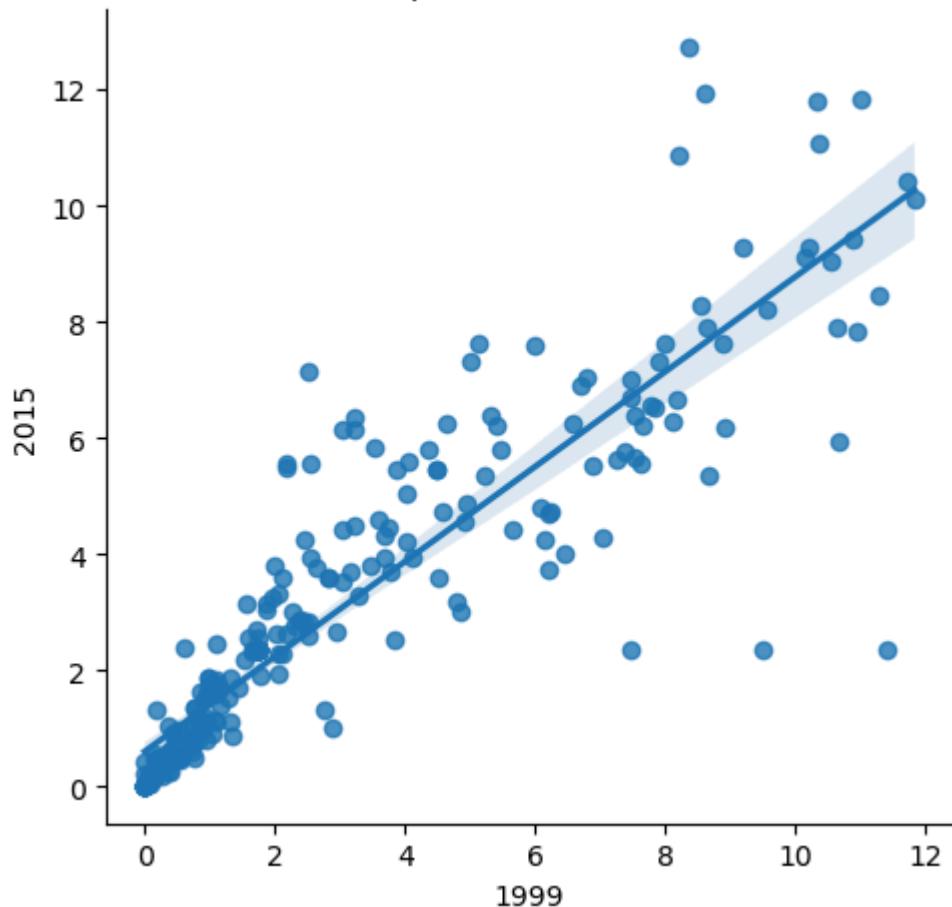
Scaterplot of 1999 vs 2014



Corelation between 1999 and 2014 : 0.8801275478092835

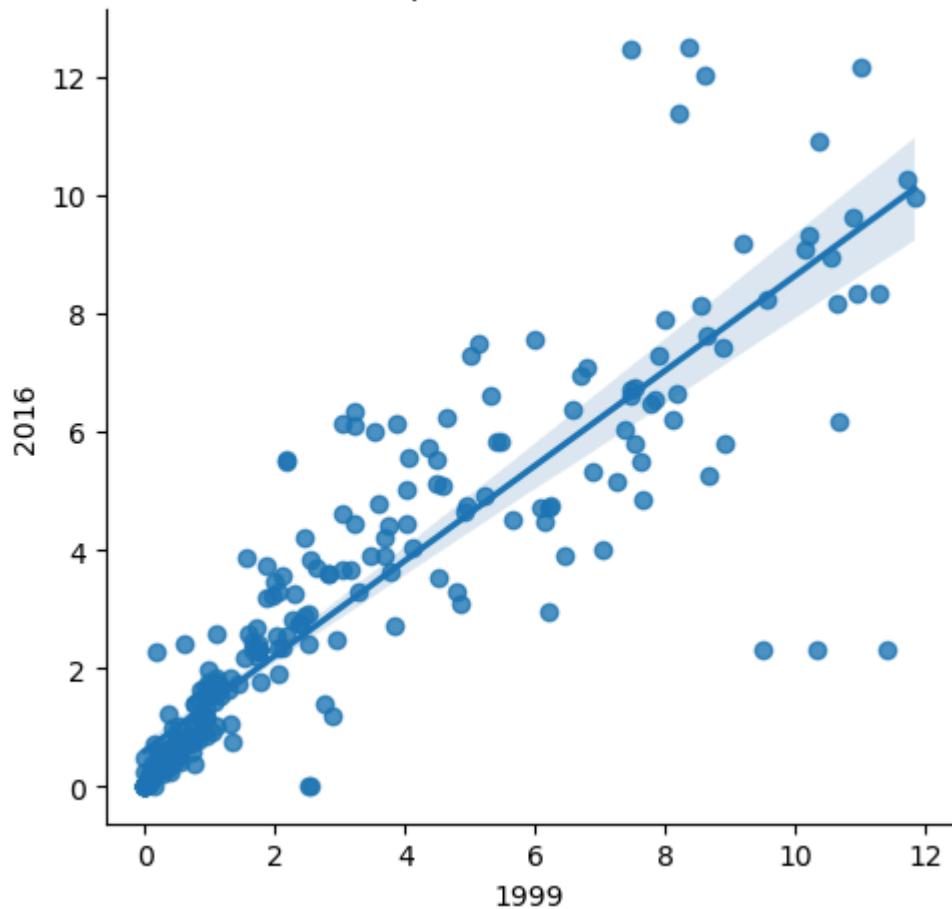
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2015



Corelation between 1999 and 2015 : 0.8978615223953953

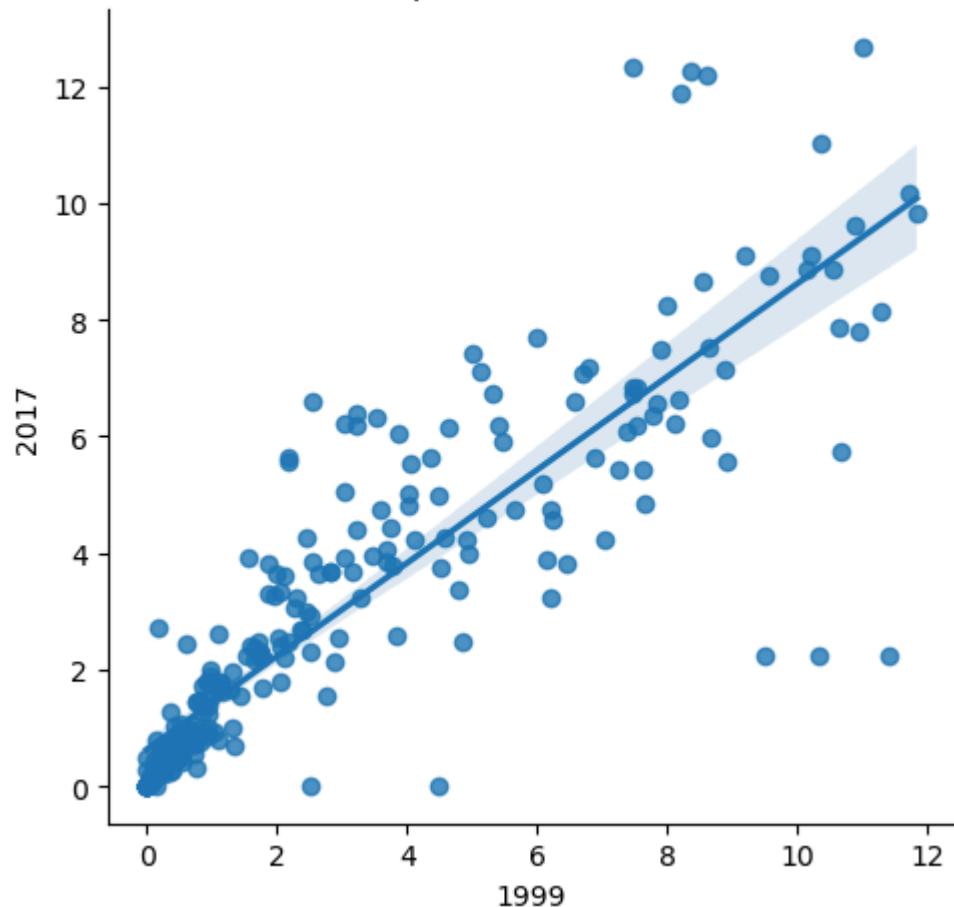
Corelation: Positively Corelated.

Scaterplot of 1999 vs 2016

Corelation between 1999 and 2016 : 0.8840615345108398

Corelation: Positively Corelated.

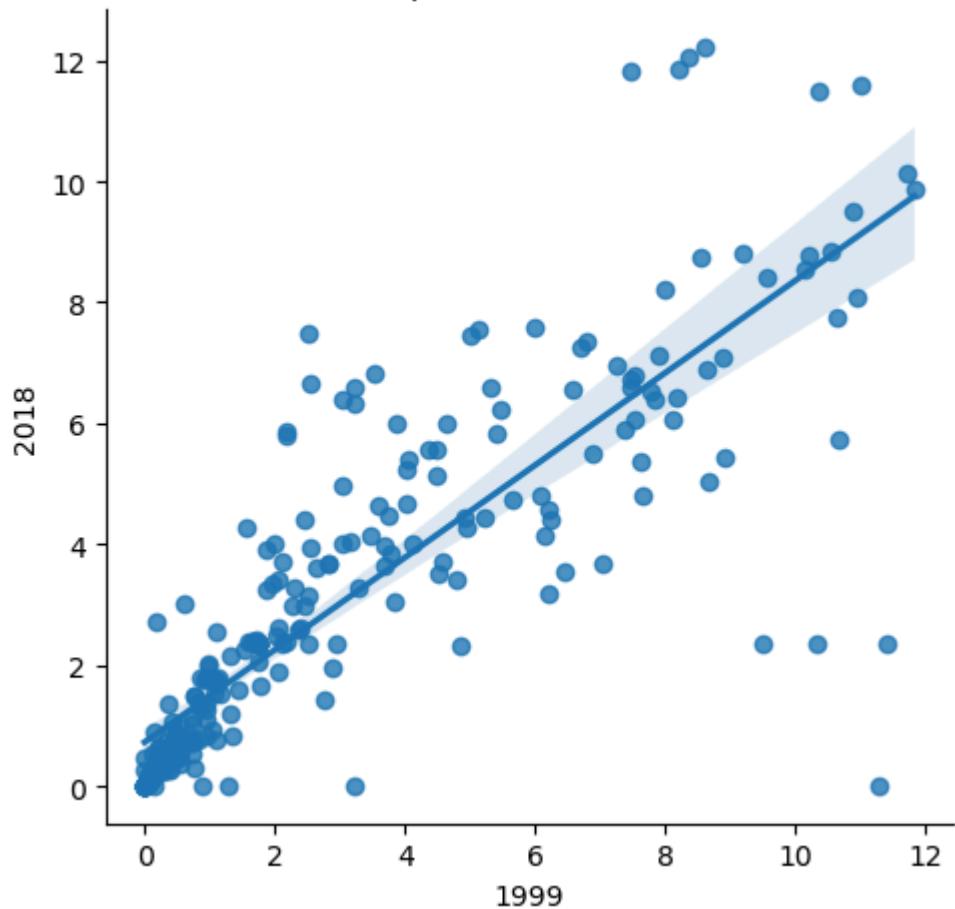
Scaterplot of 1999 vs 2017



Corelation between 1999 and 2017 : 0.8736416930280969

Corelation: Positively Corelated.

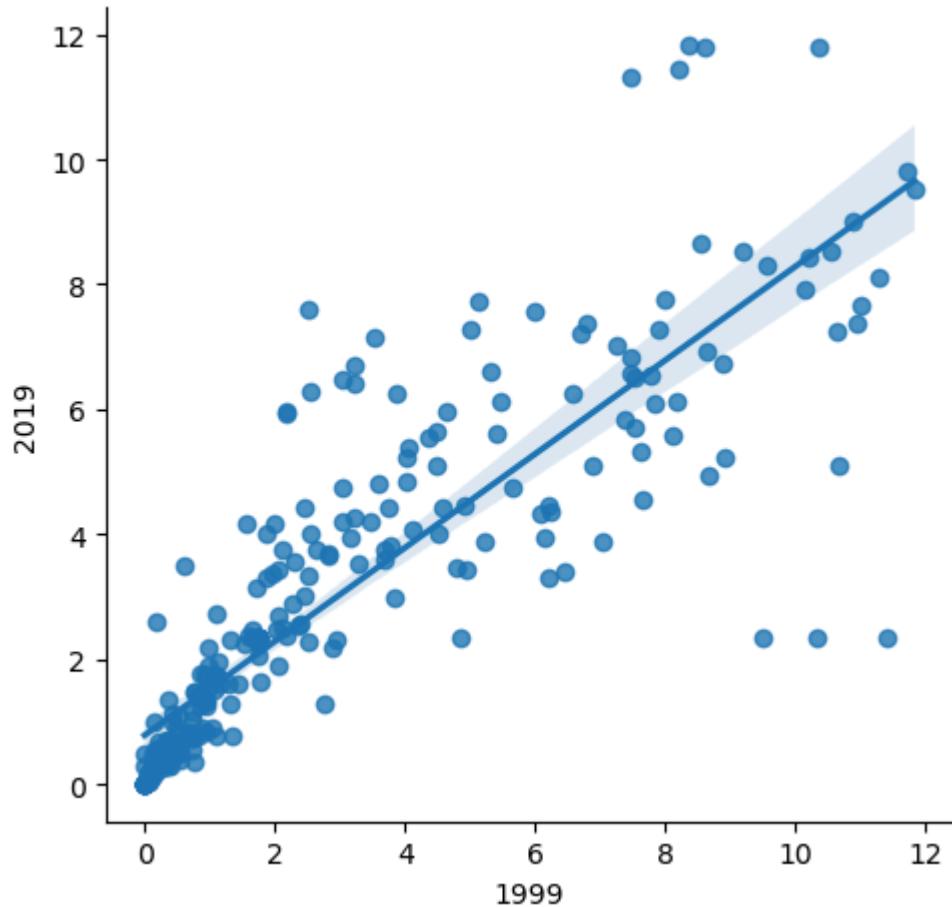
Scaterplot of 1999 vs 2018



Corelation between 1999 and 2018 : 0.8416880677251988

Corelation: Positively Corelated.

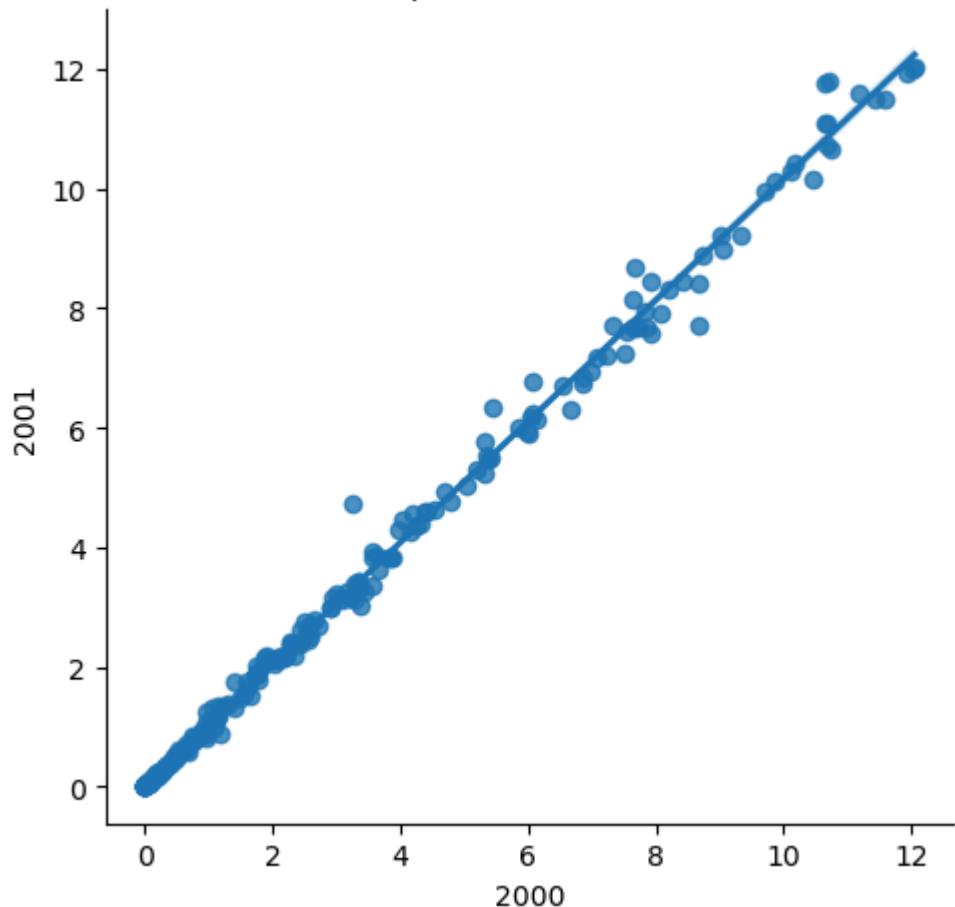
Scaterplot of 1999 vs 2019



Corelation between 1999 and 2019 : 0.8563438713095733

Corelation: Positively Corelated.

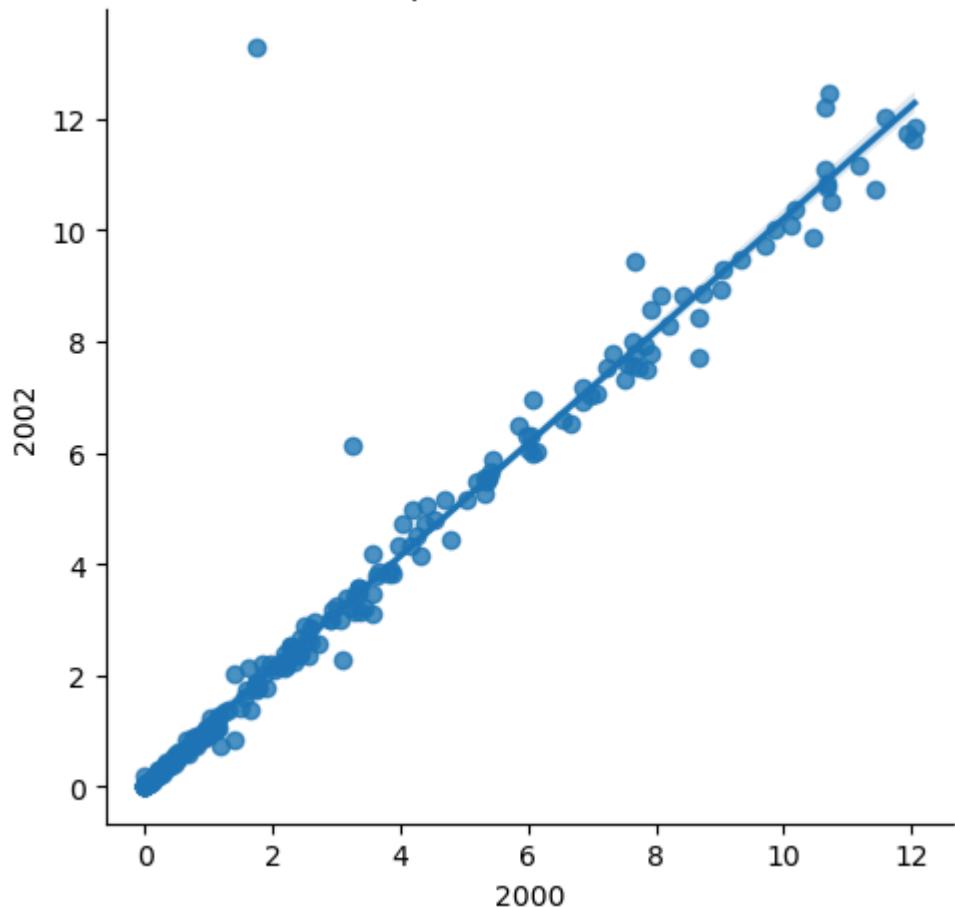
Scaterplot of 2000 vs 2001



Corelation between 2000 and 2001 : 0.9979868758251672

Corelation: Positively Corelated.

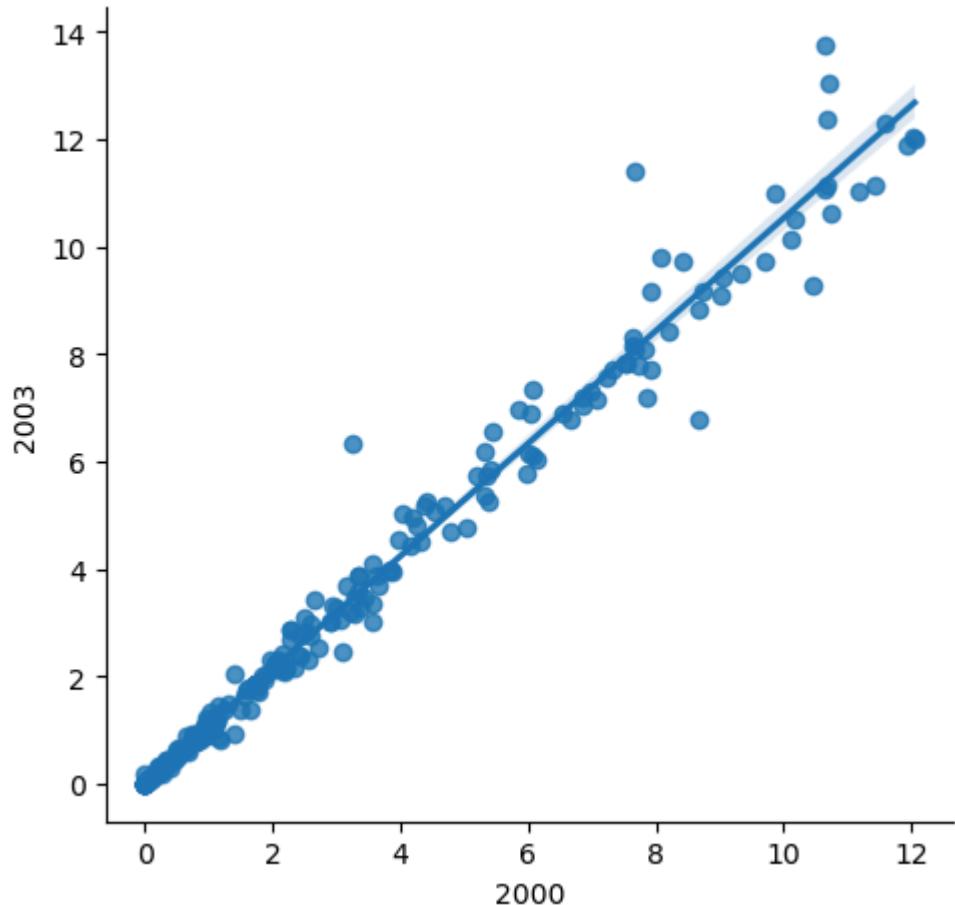
Scaterplot of 2000 vs 2002



Corelation between 2000 and 2002 : 0.9730136933707869

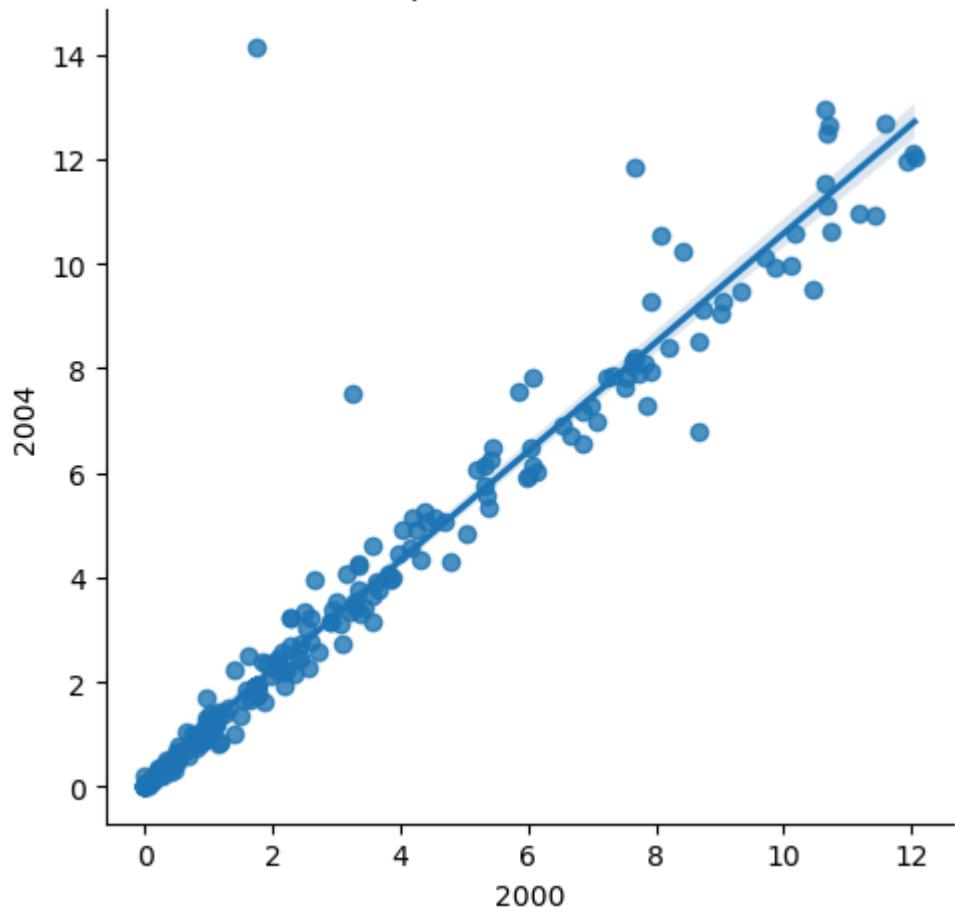
Corelation: Positively Corelated.

Scaterplot of 2000 vs 2003



Corelation between 2000 and 2003 : 0.9901556120508239

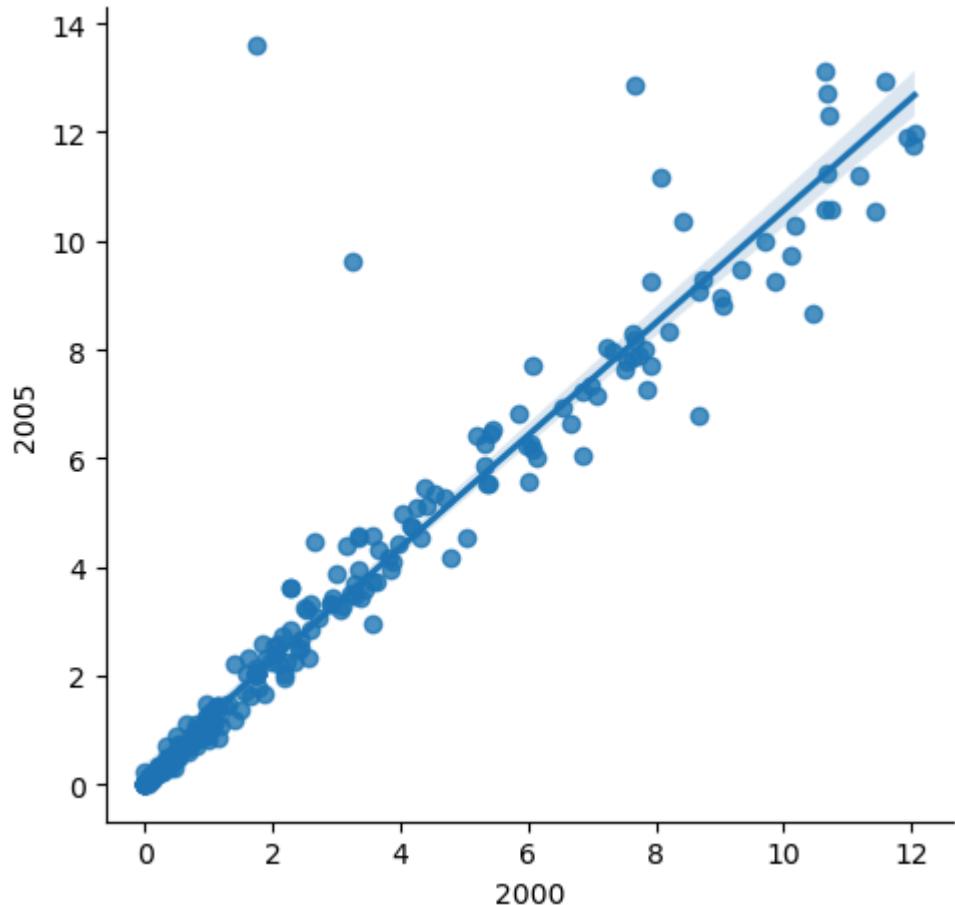
Corelation: Positively Corelated.

Scaterplot of 2000 vs 2004

Corelation between 2000 and 2004 : 0.9641545181863465

Corelation: Positively Corelated.

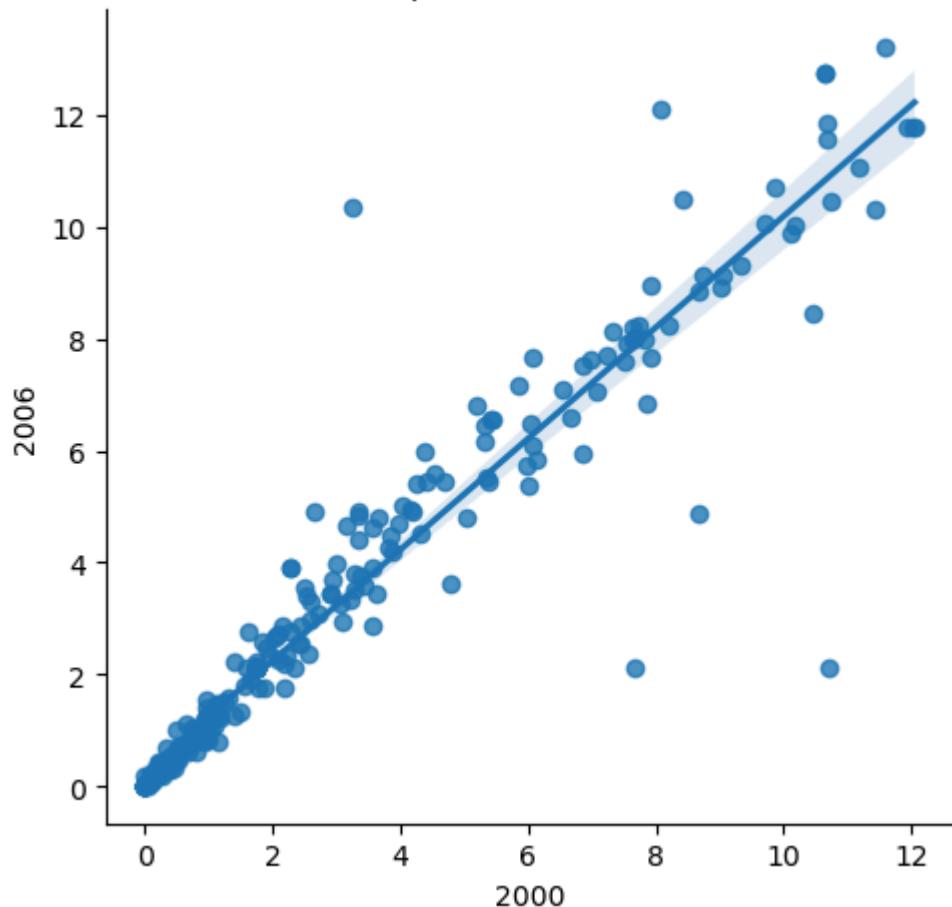
Scaterplot of 2000 vs 2005



Corelation between 2000 and 2005 : 0.9586417144076123

Corelation: Positively Corelated.

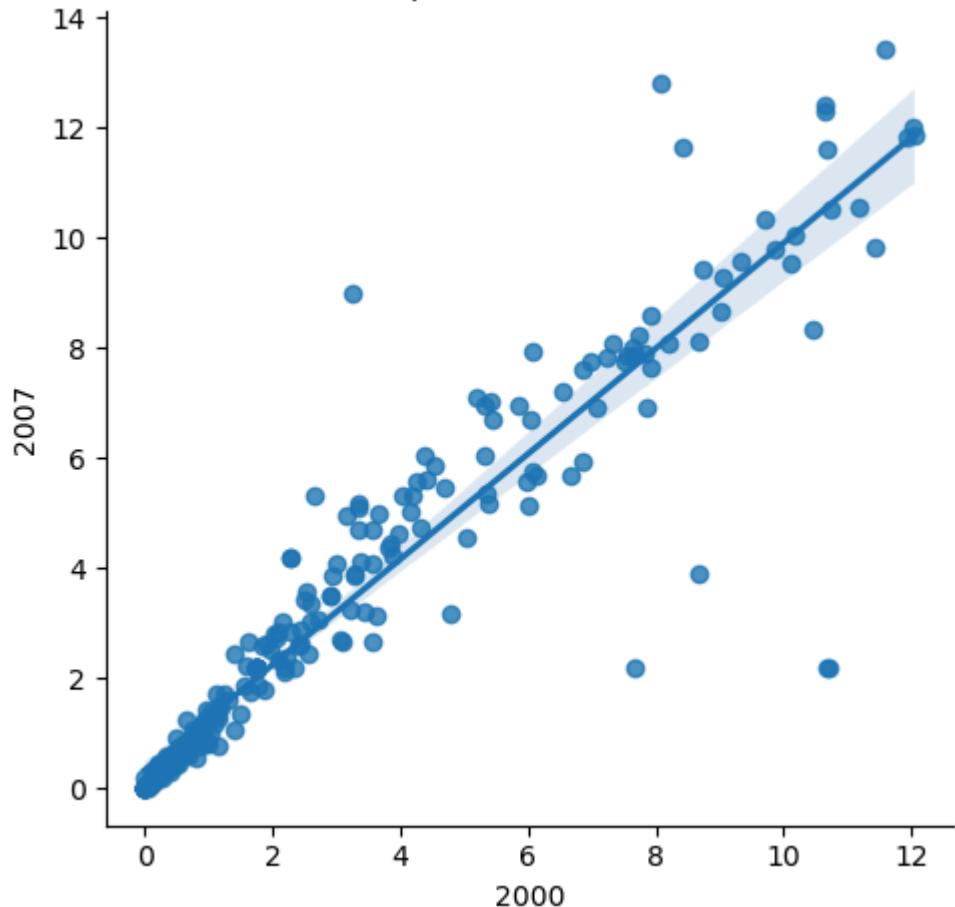
Scaterplot of 2000 vs 2006



Corelation between 2000 and 2006 : 0.9549973364855657

Corelation: Positively Corelated.

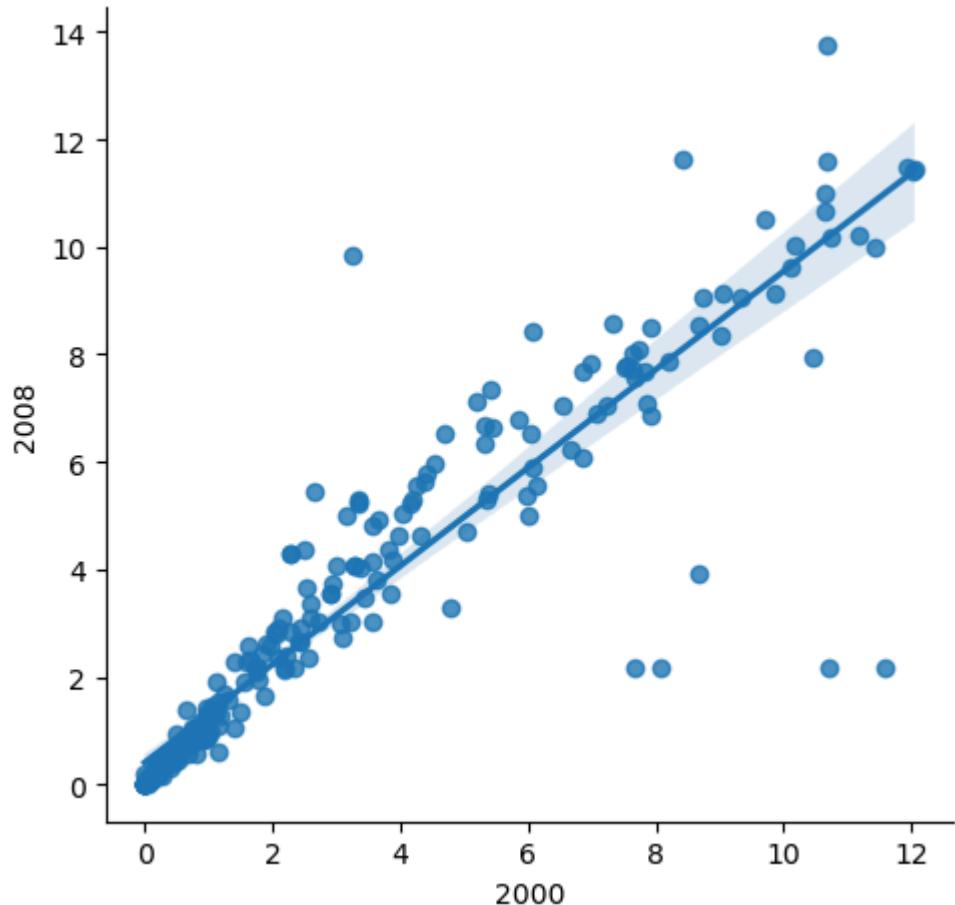
Scaterplot of 2000 vs 2007



Corelation between 2000 and 2007 : 0.9360291057677874

Corelation: Positively Corelated.

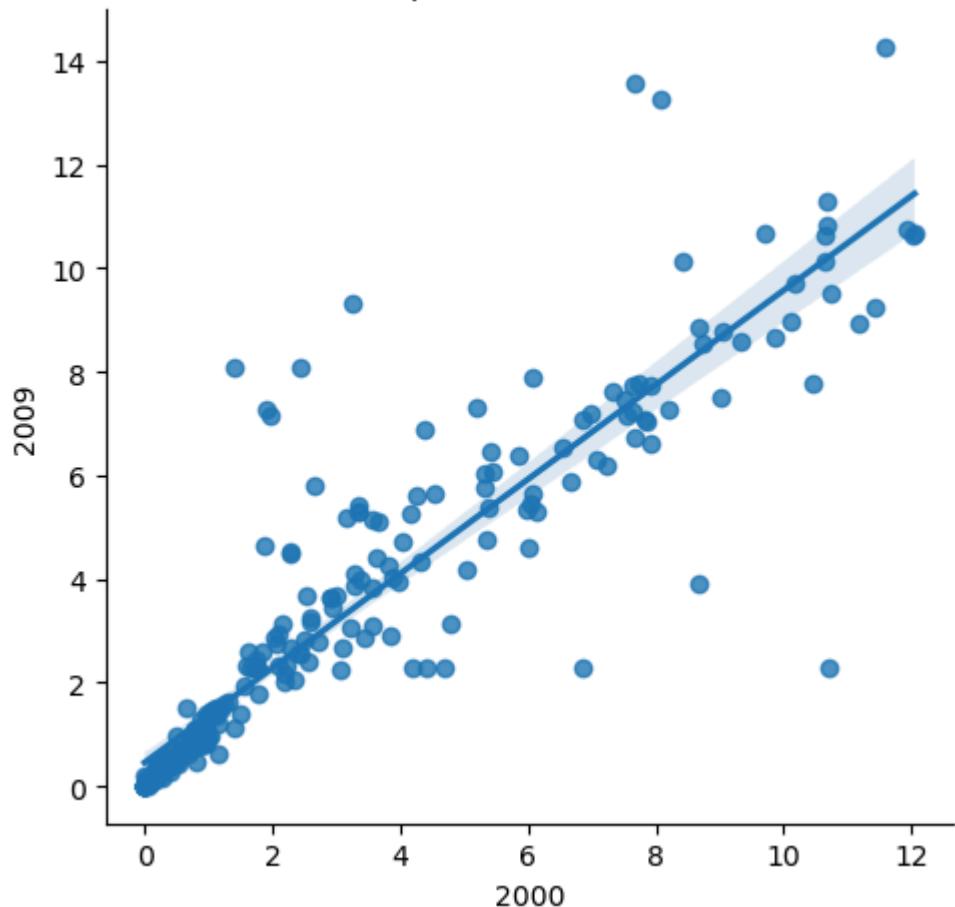
Scaterplot of 2000 vs 2008



Corelation between 2000 and 2008 : 0.9229883309508038

Corelation: Positively Corelated.

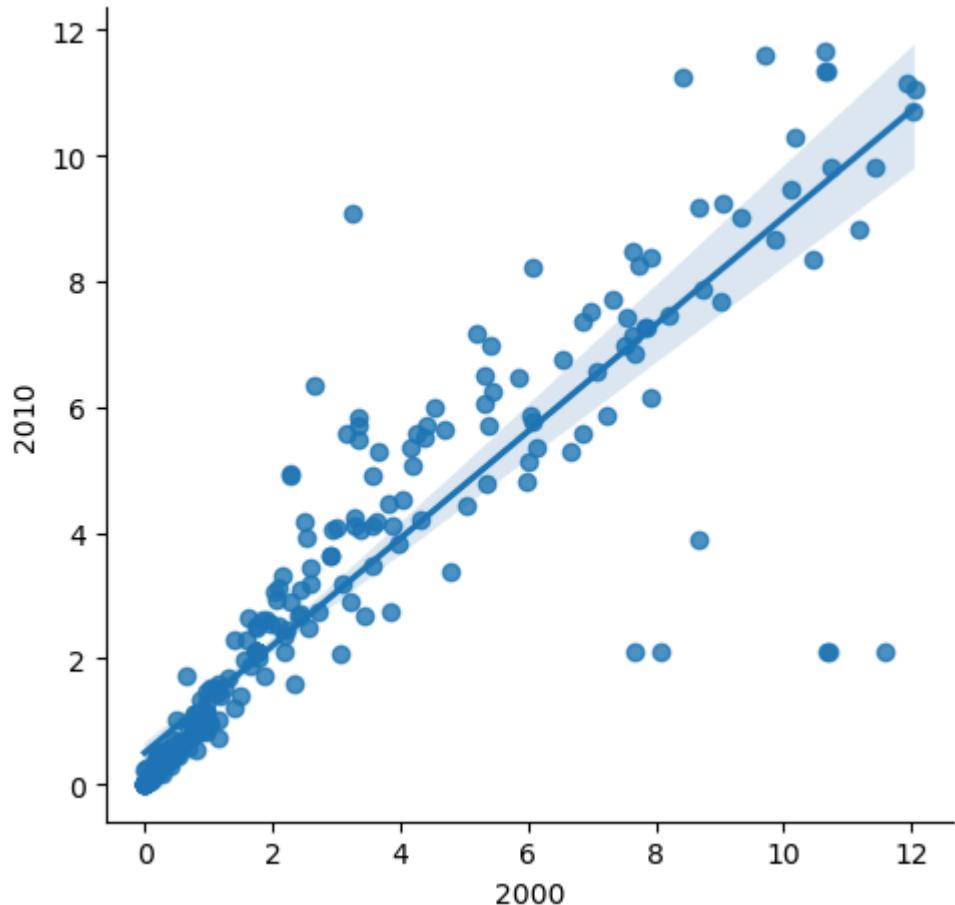
Scaterplot of 2000 vs 2009



Corelation between 2000 and 2009 : 0.9100541425733594

Corelation: Positively Corelated.

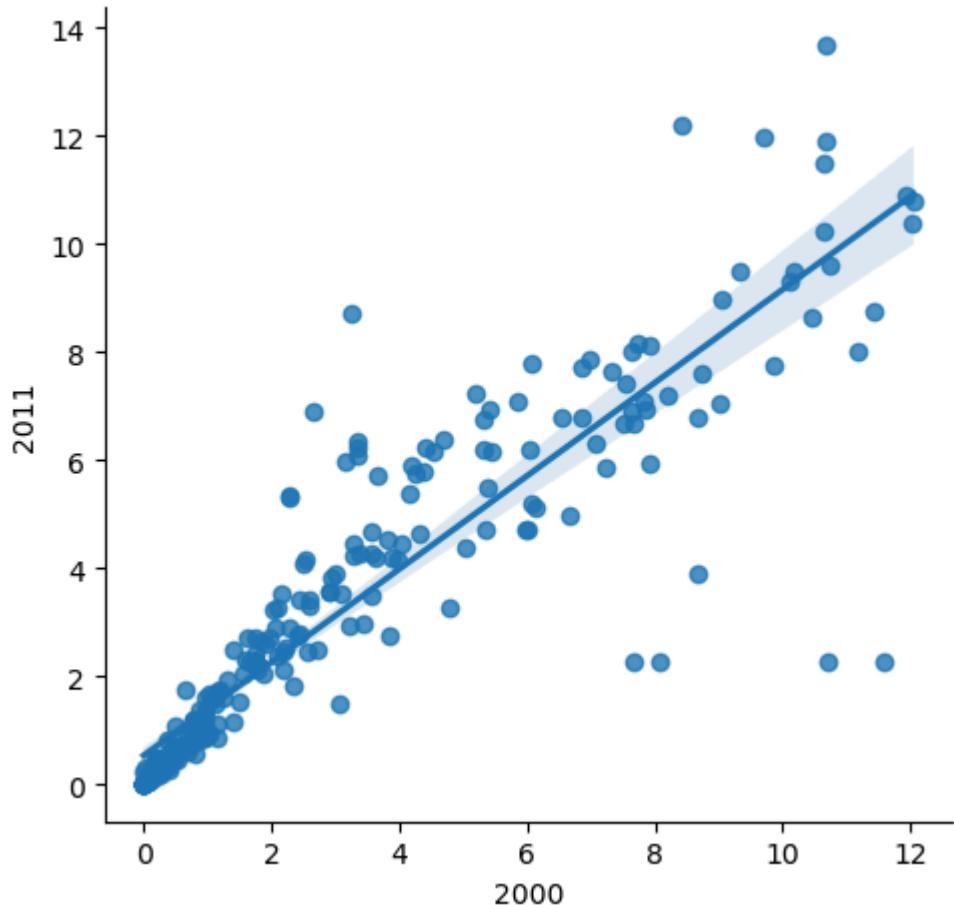
Scaterplot of 2000 vs 2010



Corelation between 2000 and 2010 : 0.9011004837800933

Corelation: Positively Corelated.

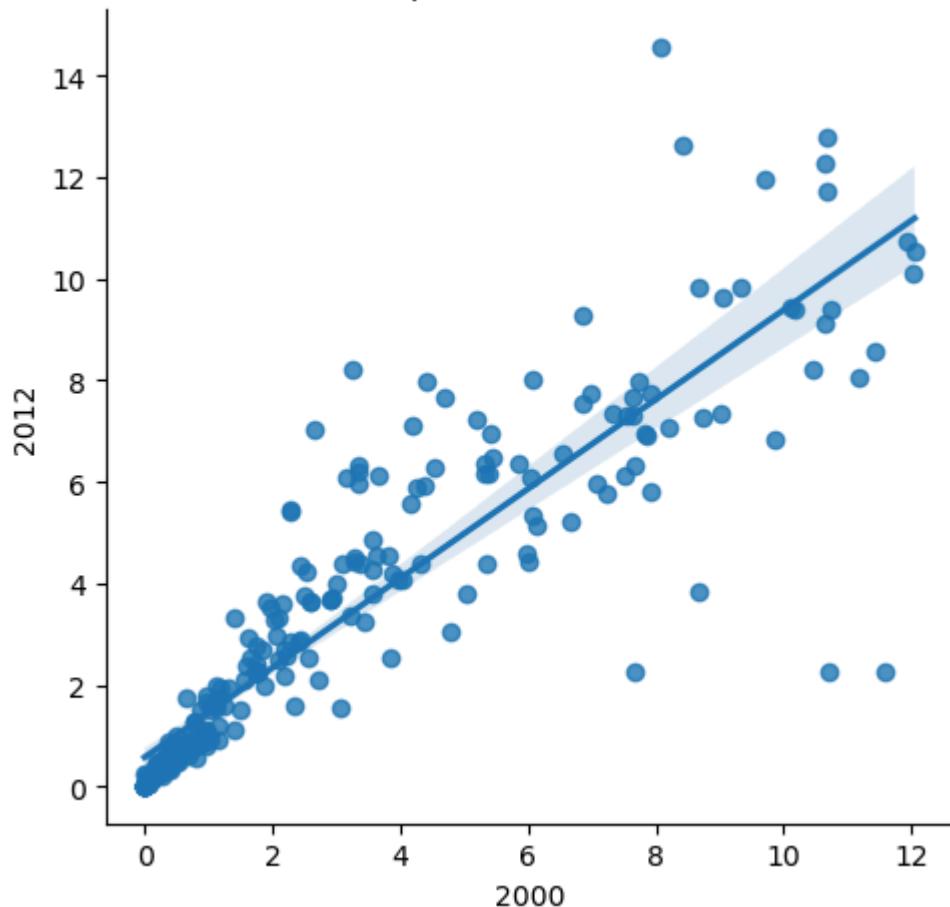
Scaterplot of 2000 vs 2011



Corelation between 2000 and 2011 : 0.9033921591149074

Corelation: Positively Corelated.

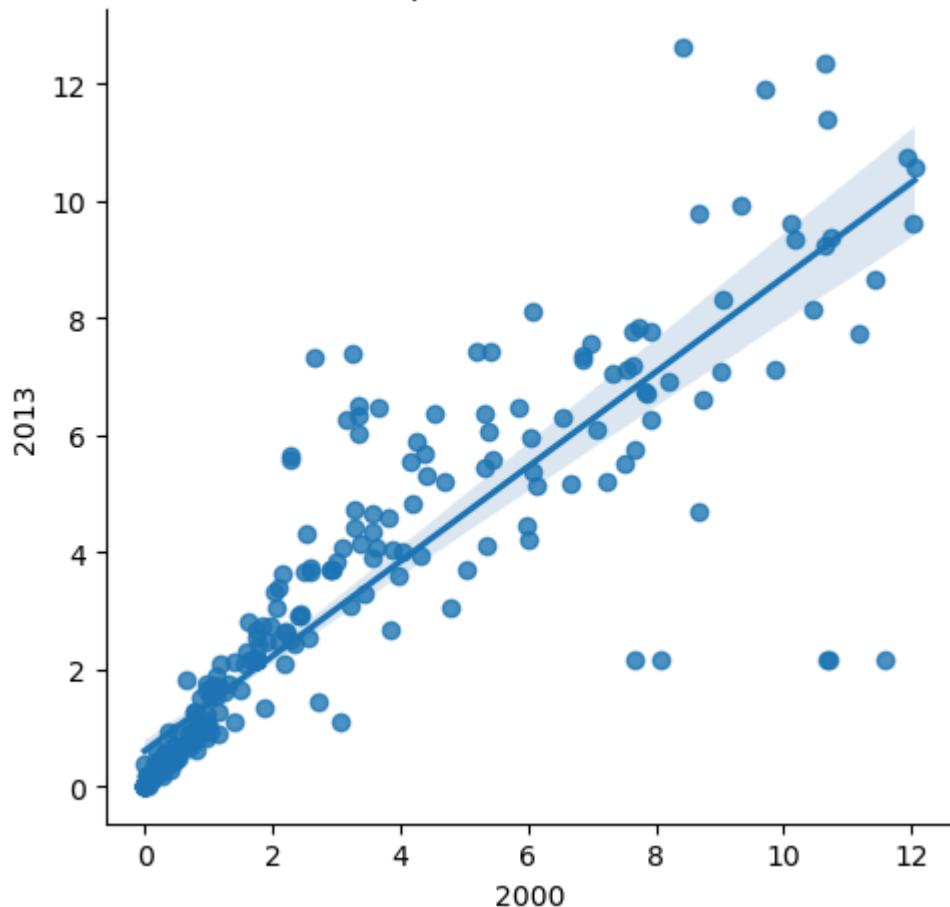
Scaterplot of 2000 vs 2012



Corelation between 2000 and 2012 : 0.8944982727236006

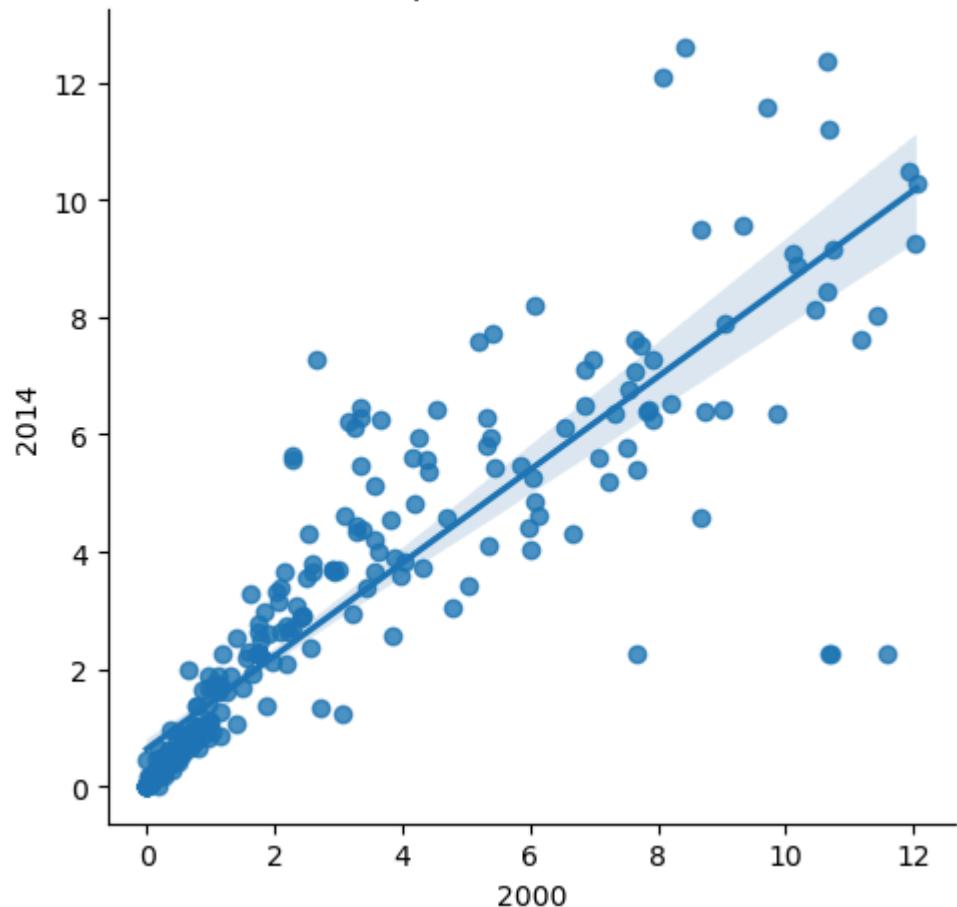
Corelation: Positively Corelated.

Scaterplot of 2000 vs 2013



Corelation between 2000 and 2013 : 0.8822696215774752

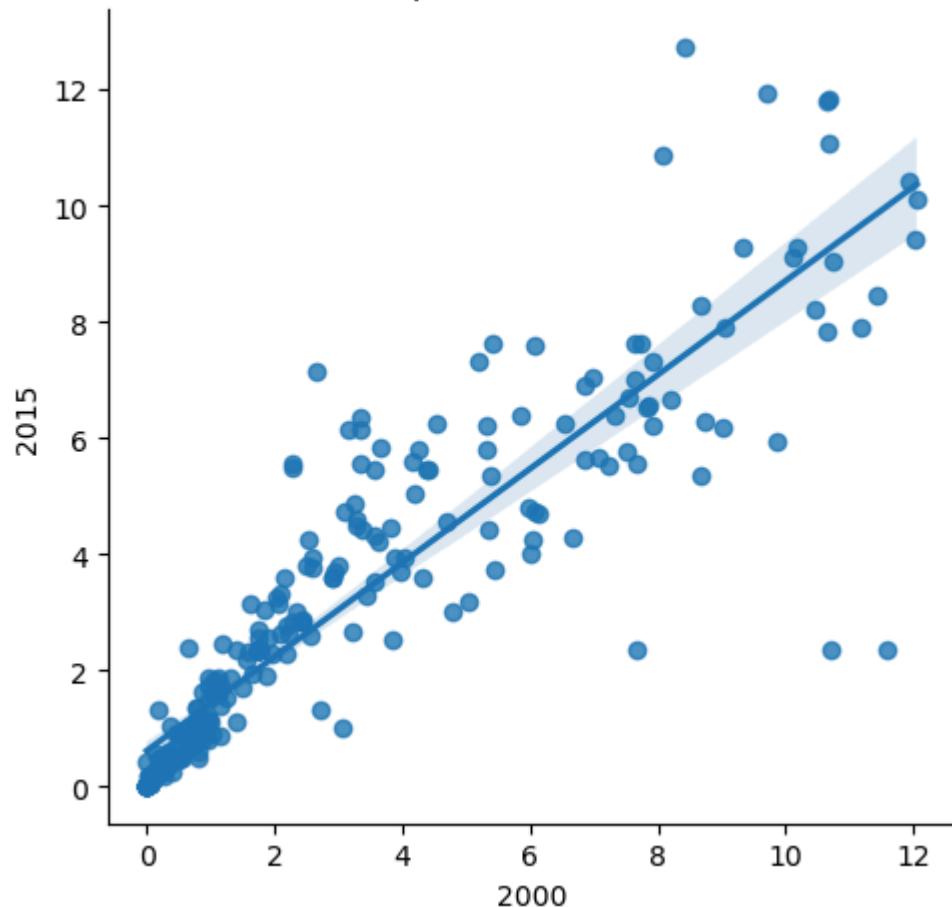
Corelation: Positively Corelated.

Scaterplot of 2000 vs 2014

Corelation between 2000 and 2014 : 0.8803287331095474

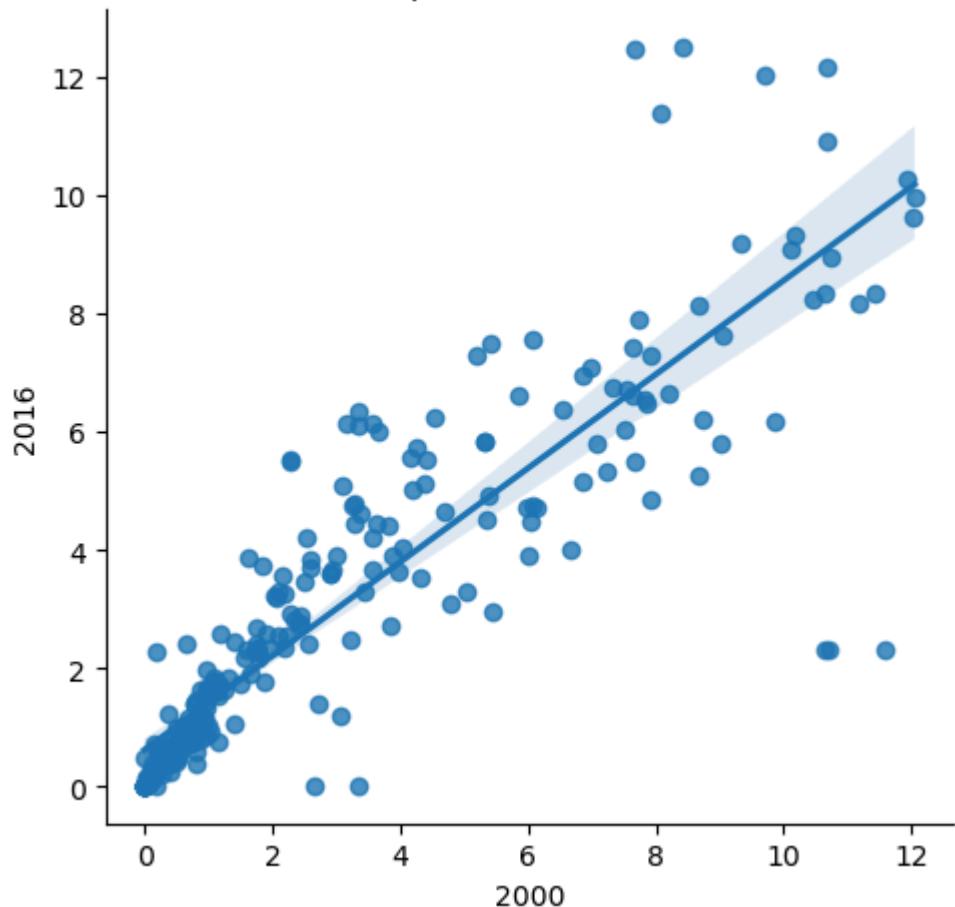
Corelation: Positively Corelated.

Scaterplot of 2000 vs 2015



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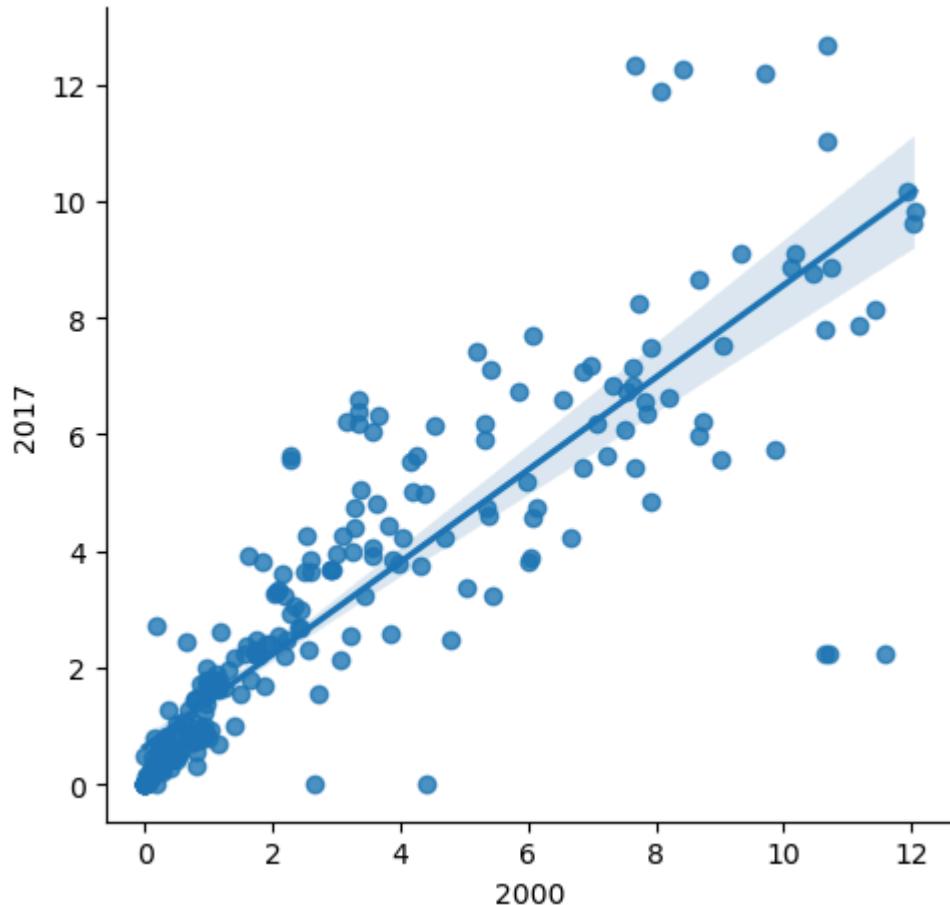
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Scaterplot of 2000 vs 2016

Corelation between 2000 and 2016 : 0.8819219260134905

Corelation: Positively Corelated.

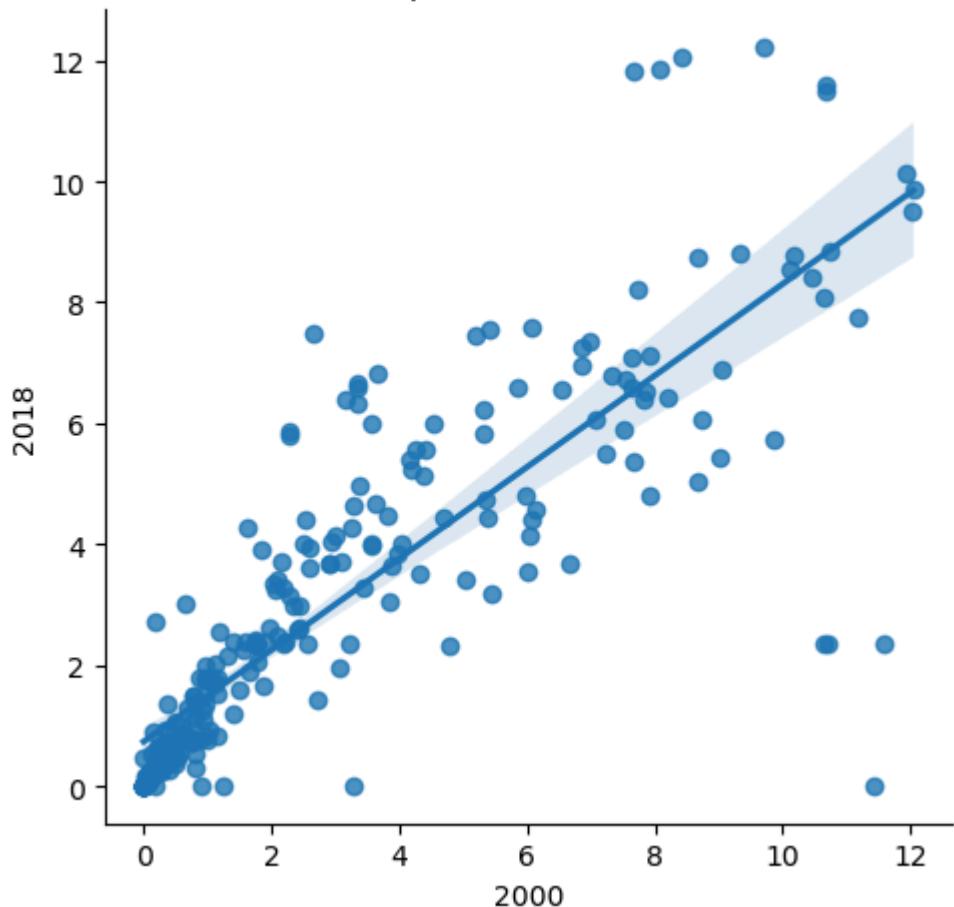
Scaterplot of 2000 vs 2017



Corelation between 2000 and 2017 : 0.8752545060849718

Corelation: Positively Corelated.

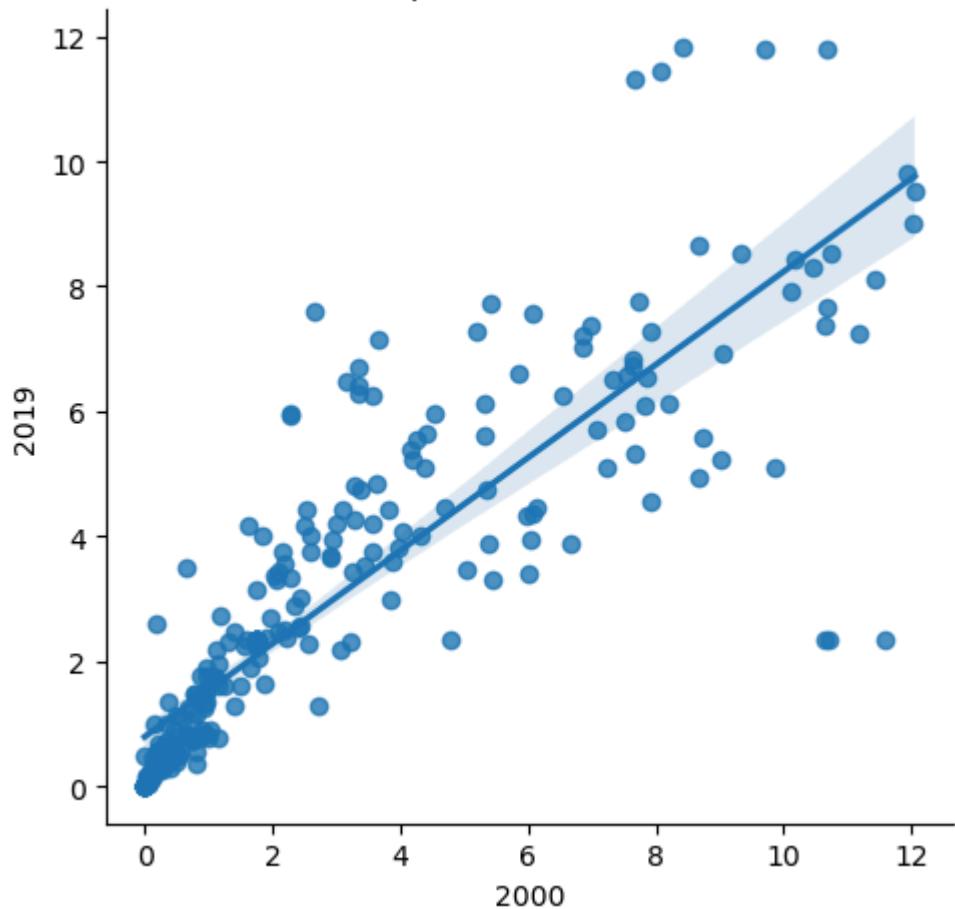
Scaterplot of 2000 vs 2018



Corelation between 2000 and 2018 : 0.843498301460067

Corelation: Positively Corelated.

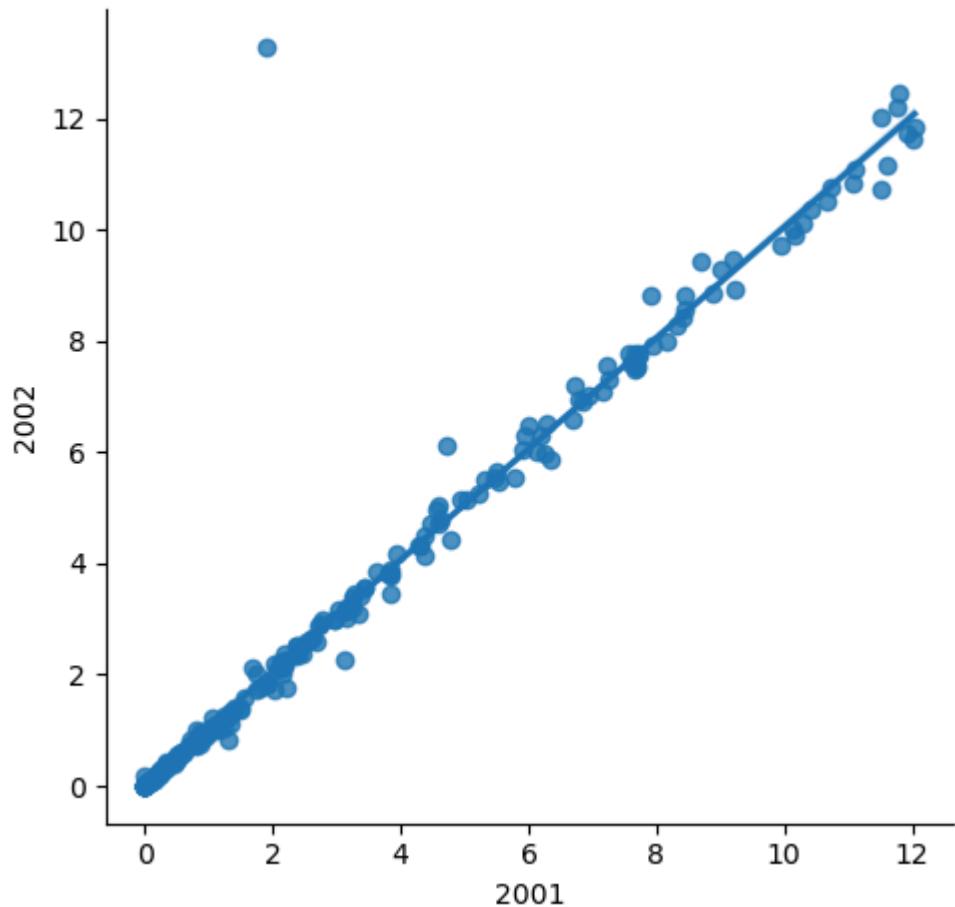
Scaterplot of 2000 vs 2019



Corelation between 2000 and 2019 : 0.8592686589171604

Corelation: Positively Corelated.

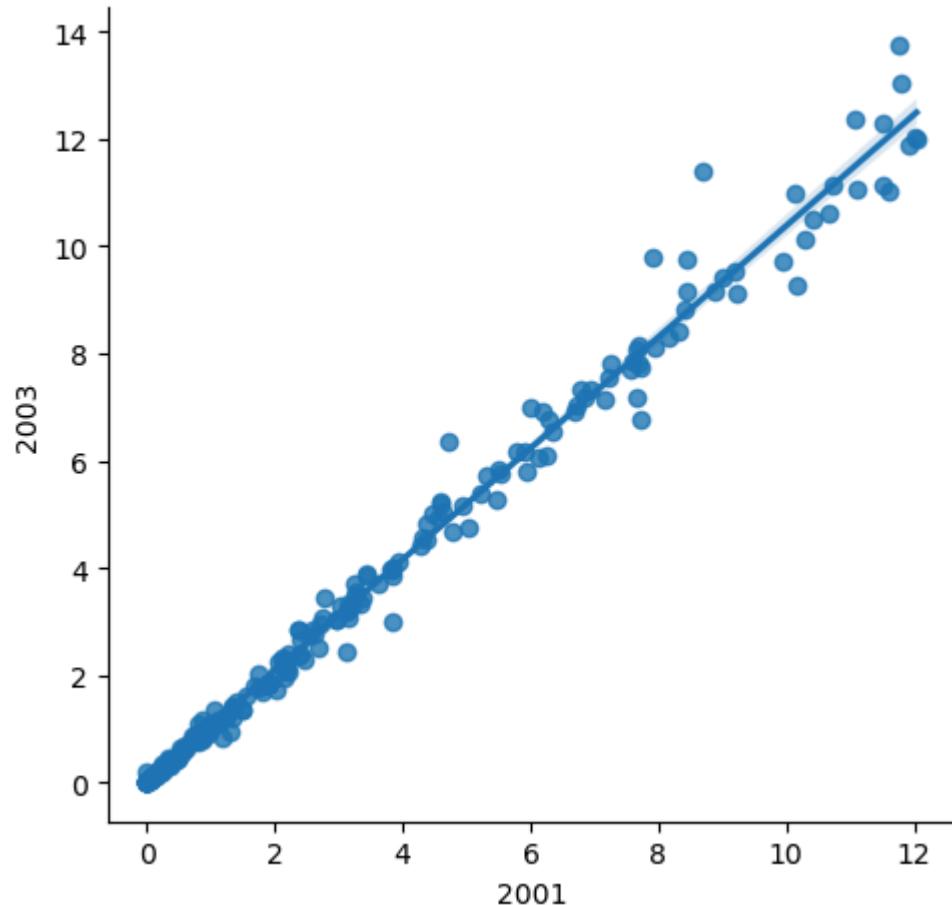
Scaterplot of 2001 vs 2002



Corelation between 2001 and 2002 : 0.9762580375945022

Corelation: Positively Corelated.

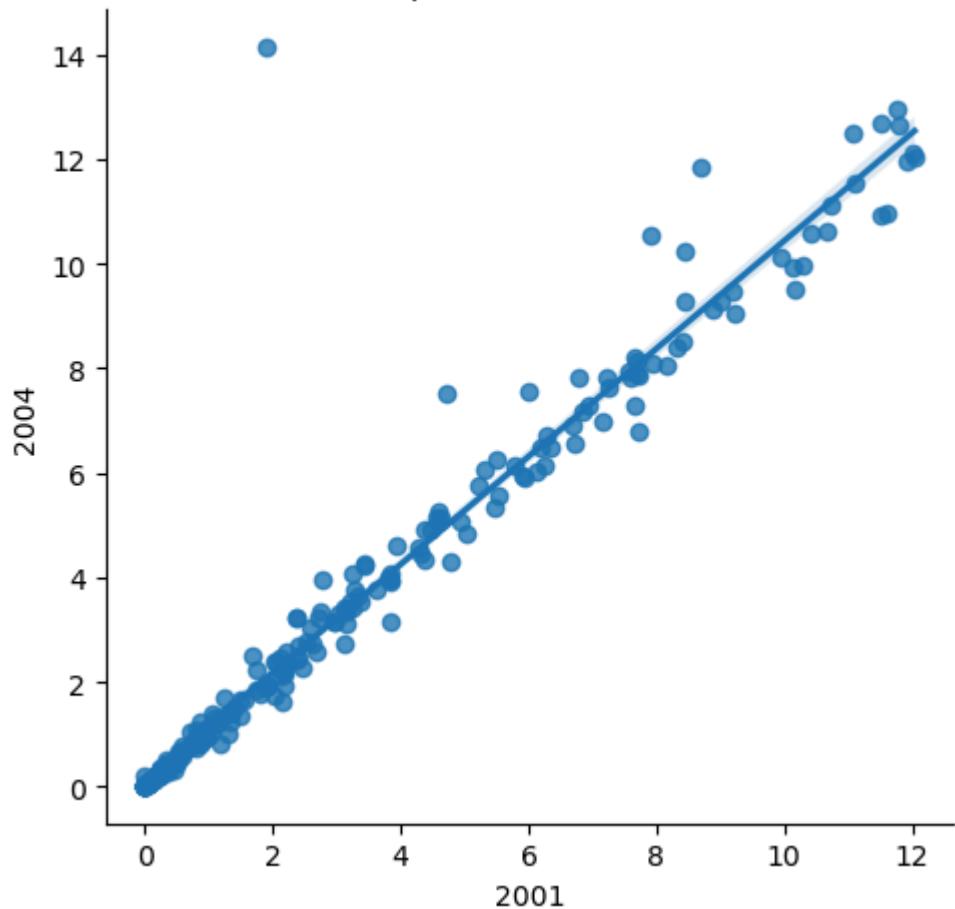
Scaterplot of 2001 vs 2003



Corelation between 2001 and 2003 : 0.9950403740600808

Corelation: Positively Corelated.

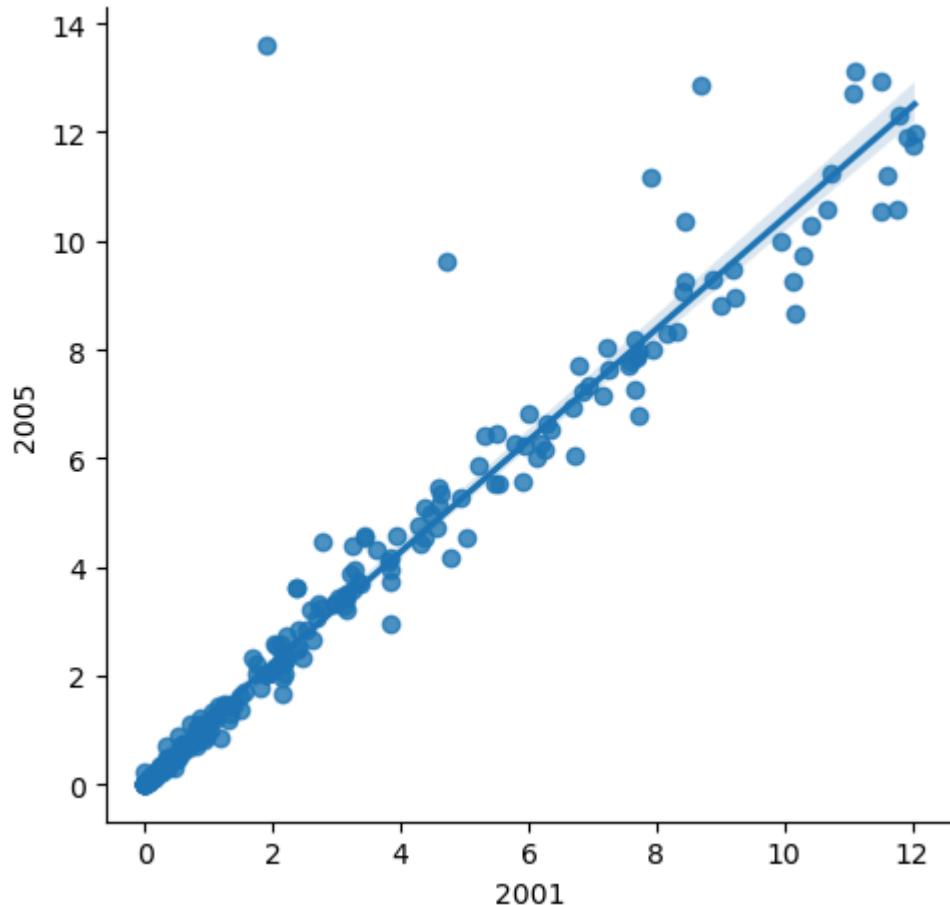
Scaterplot of 2001 vs 2004



Corelation between 2001 and 2004 : 0.9696347042416723

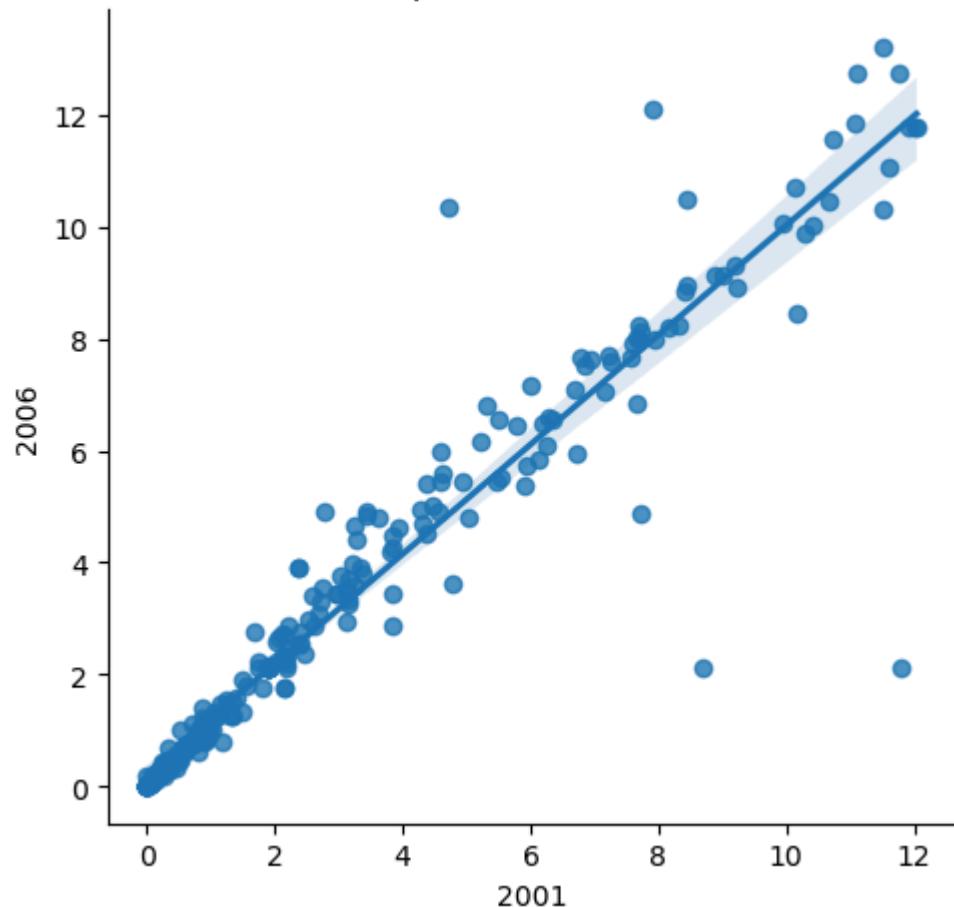
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2005



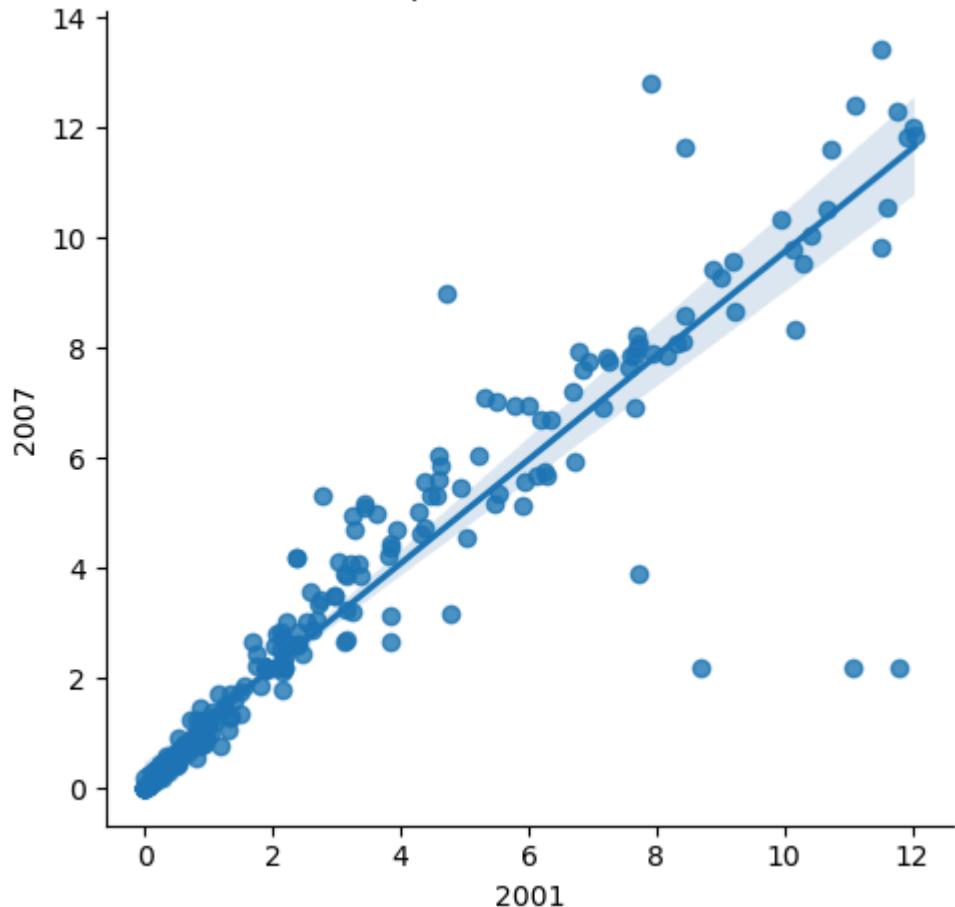
Corelation between 2001 and 2005 : 0.9648186167552576

Corelation: Positively Corelated.

Scaterplot of 2001 vs 2006

Corelation between 2001 and 2006 : 0.956446772941455

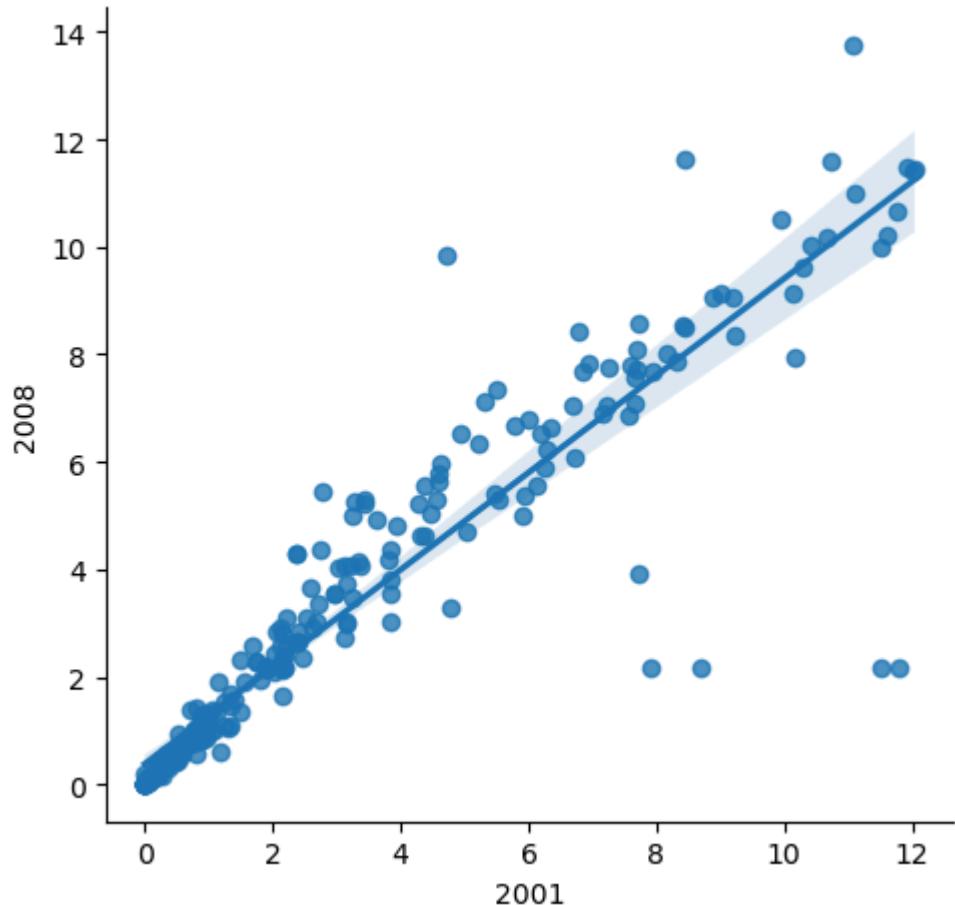
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2007

Corelation between 2001 and 2007 : 0.9364626174955131

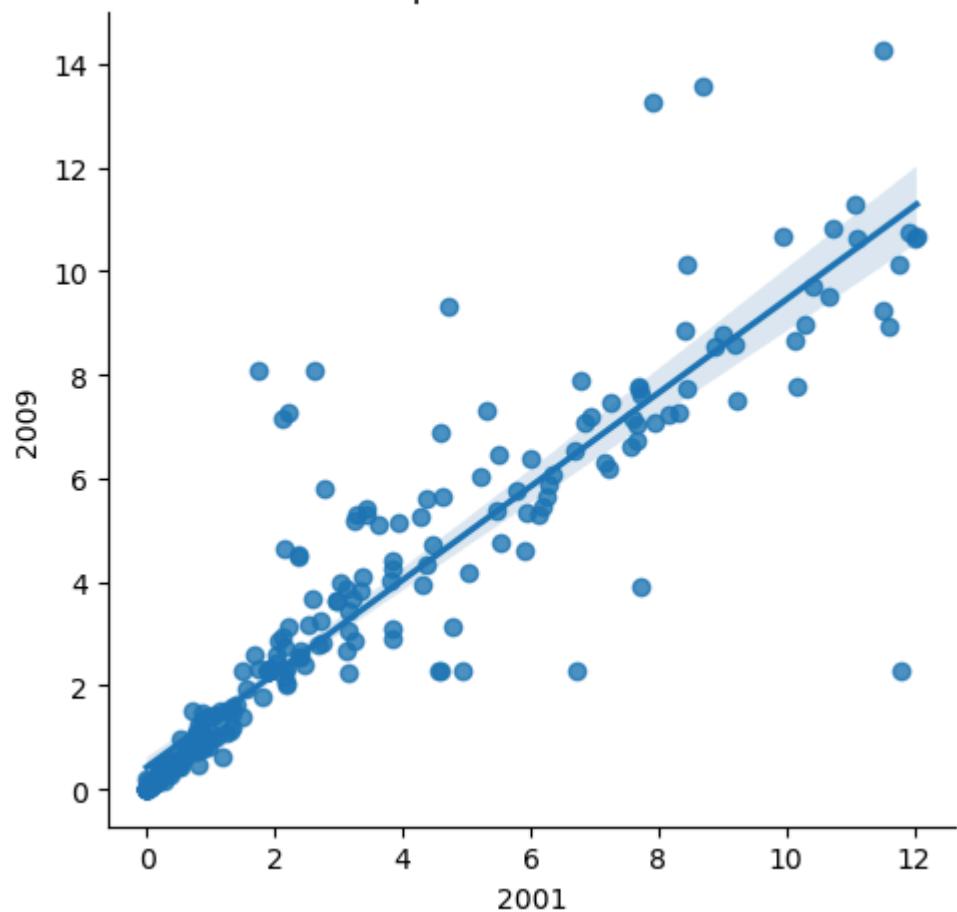
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2008



Corelation between 2001 and 2008 : 0.9267667807327309

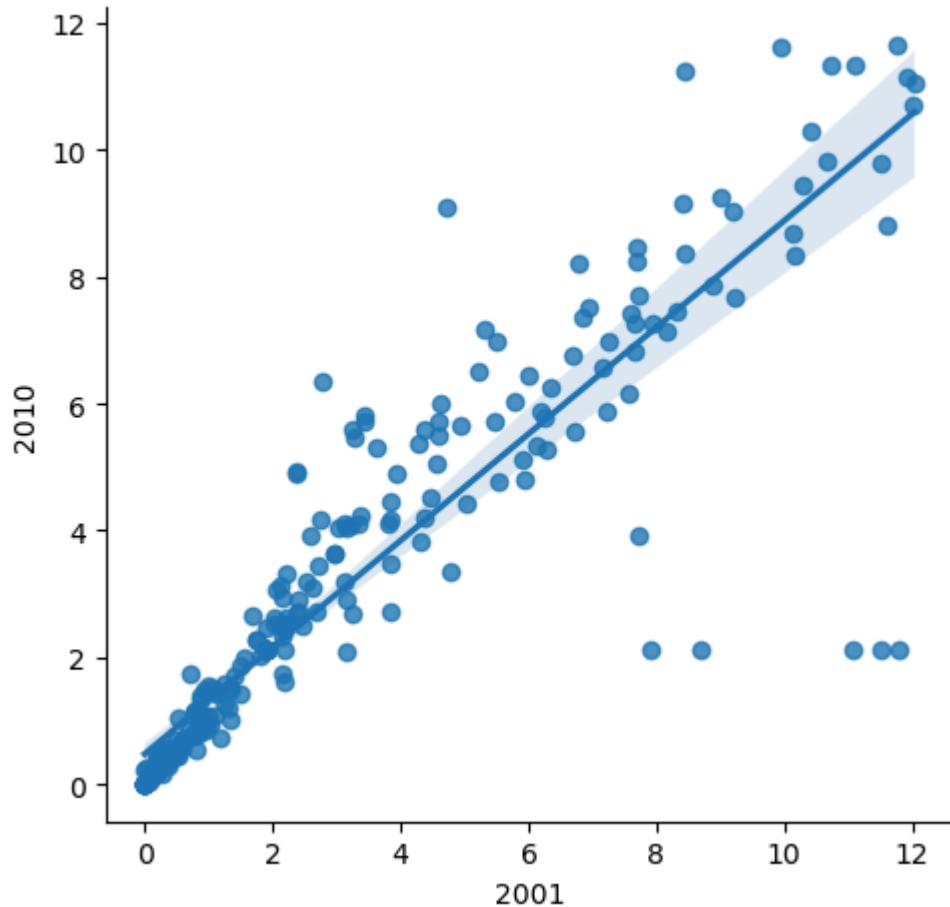
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2009

Corelation between 2001 and 2009 : 0.9158076750423213

Corelation: Positively Corelated.

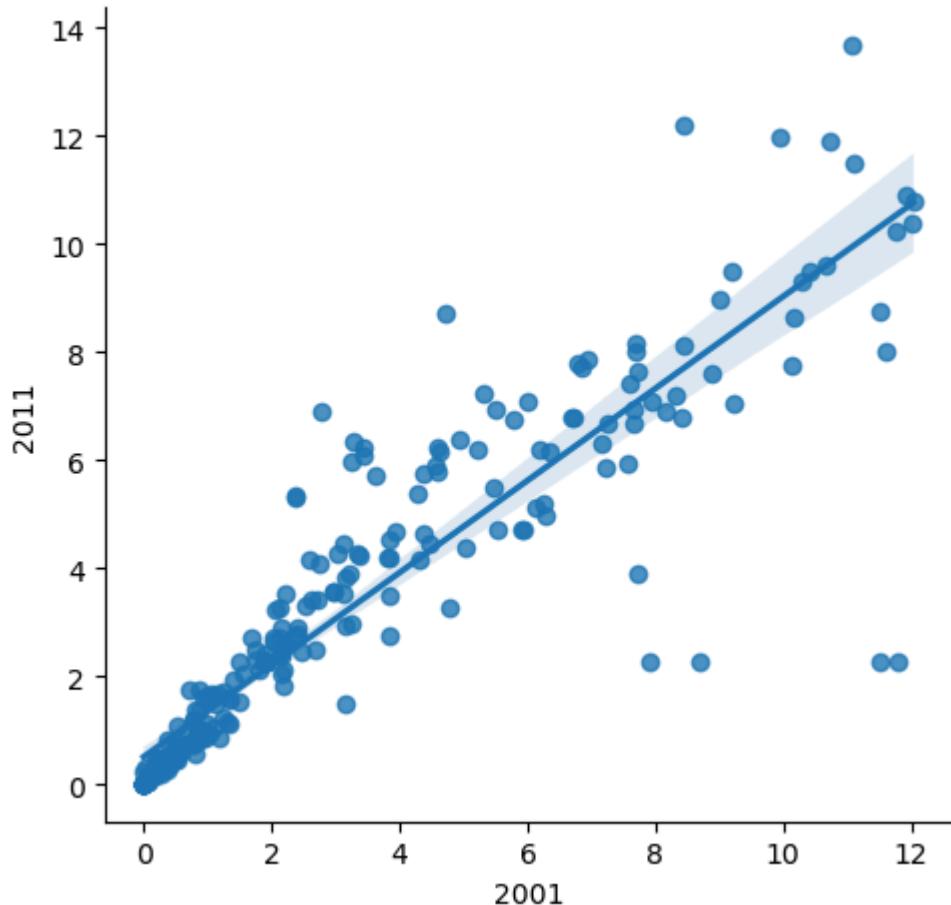
Scaterplot of 2001 vs 2010



Corelation between 2001 and 2010 : 0.9041567645559722

Corelation: Positively Corelated.

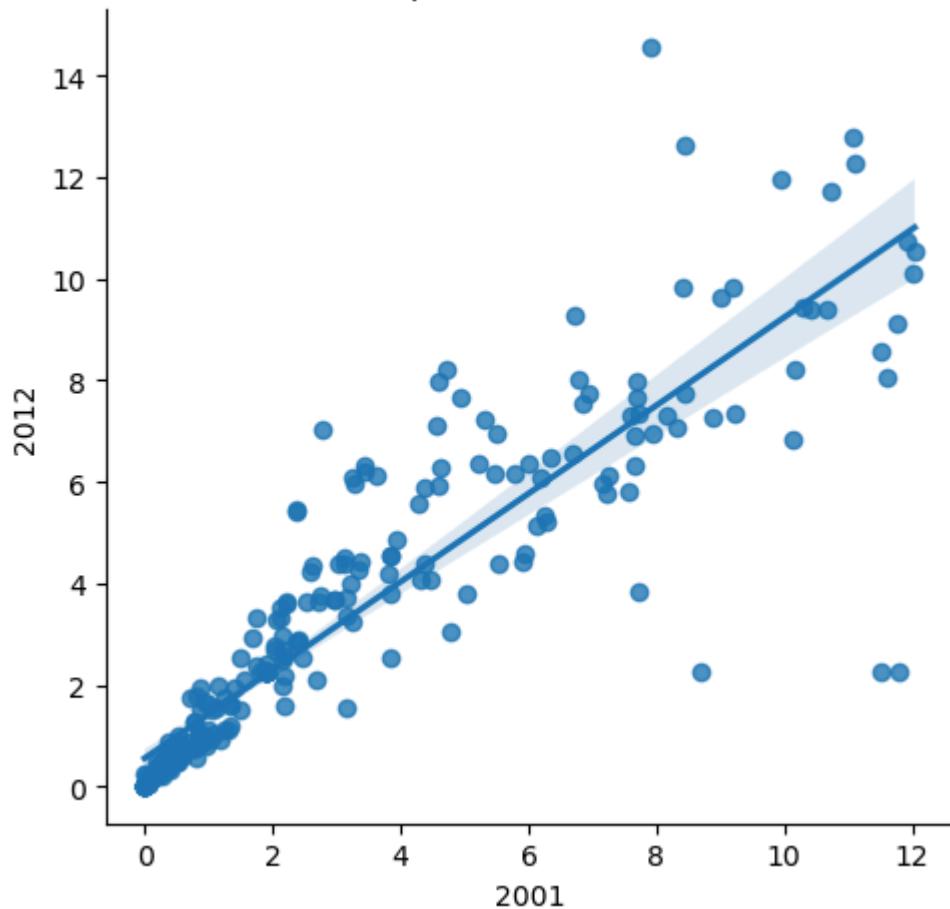
Scaterplot of 2001 vs 2011



Corelation between 2001 and 2011 : 0.9070291388837215

Corelation: Positively Corelated.

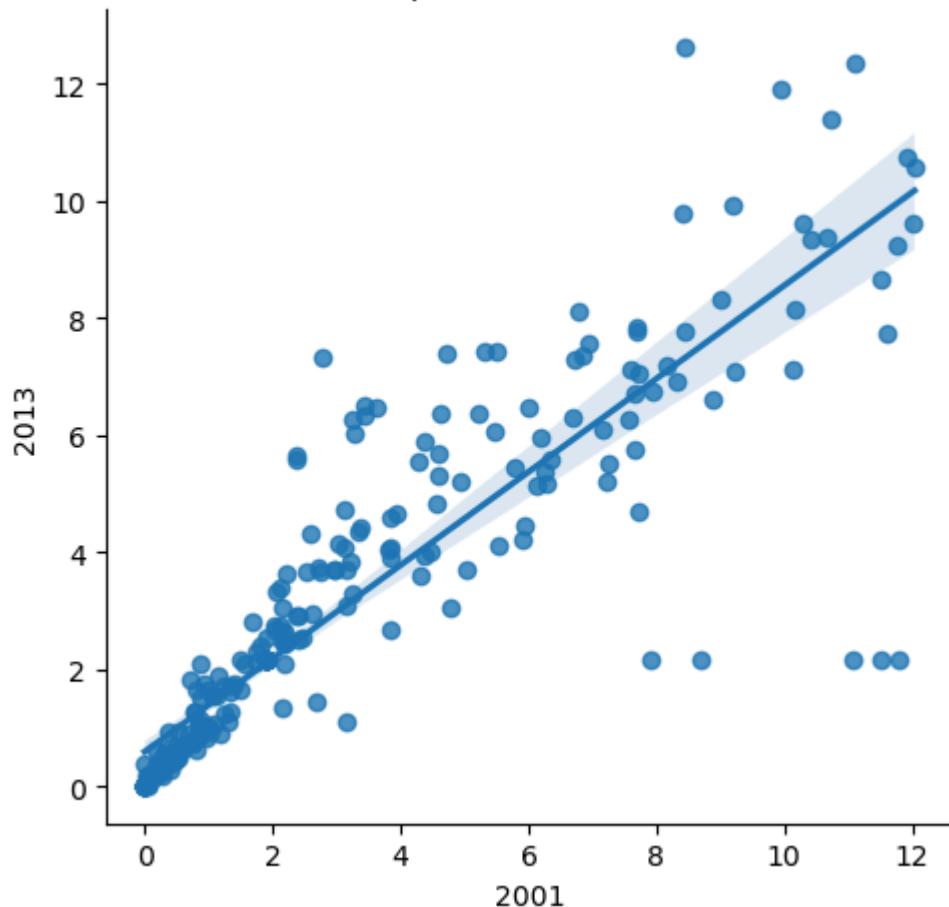
Scaterplot of 2001 vs 2012



Corelation between 2001 and 2012 : 0.8959650909958655

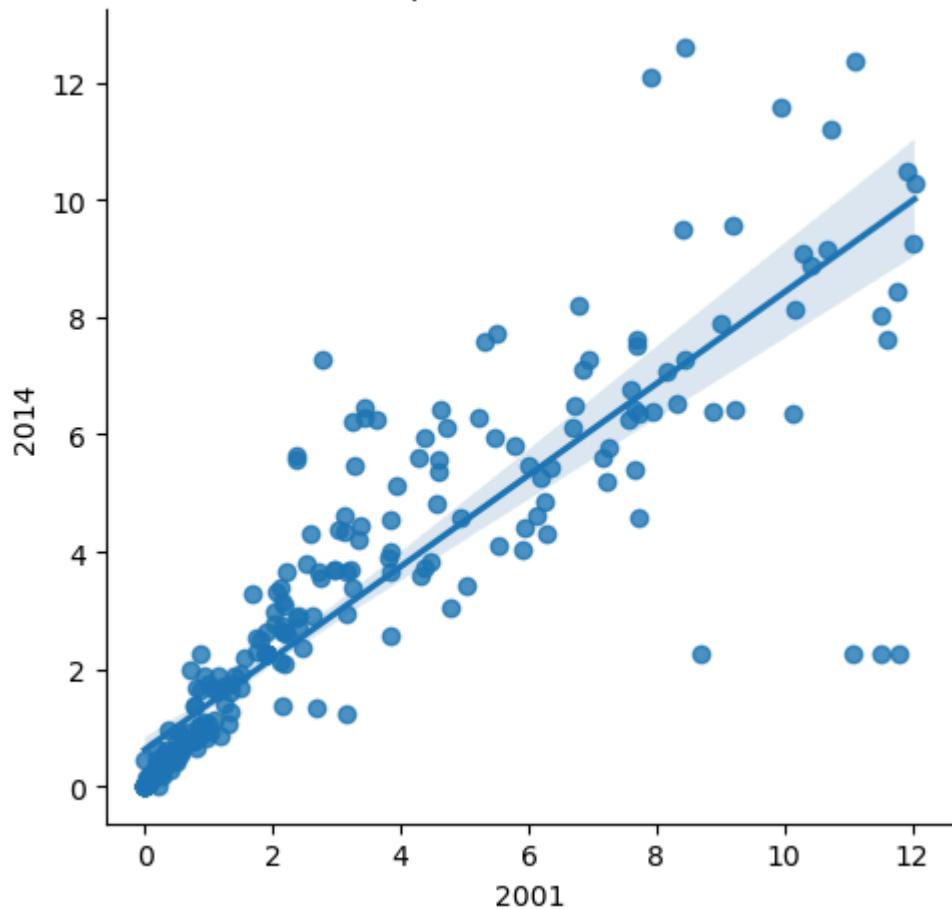
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2013



Corelation between 2001 and 2013 : 0.8826201889173927

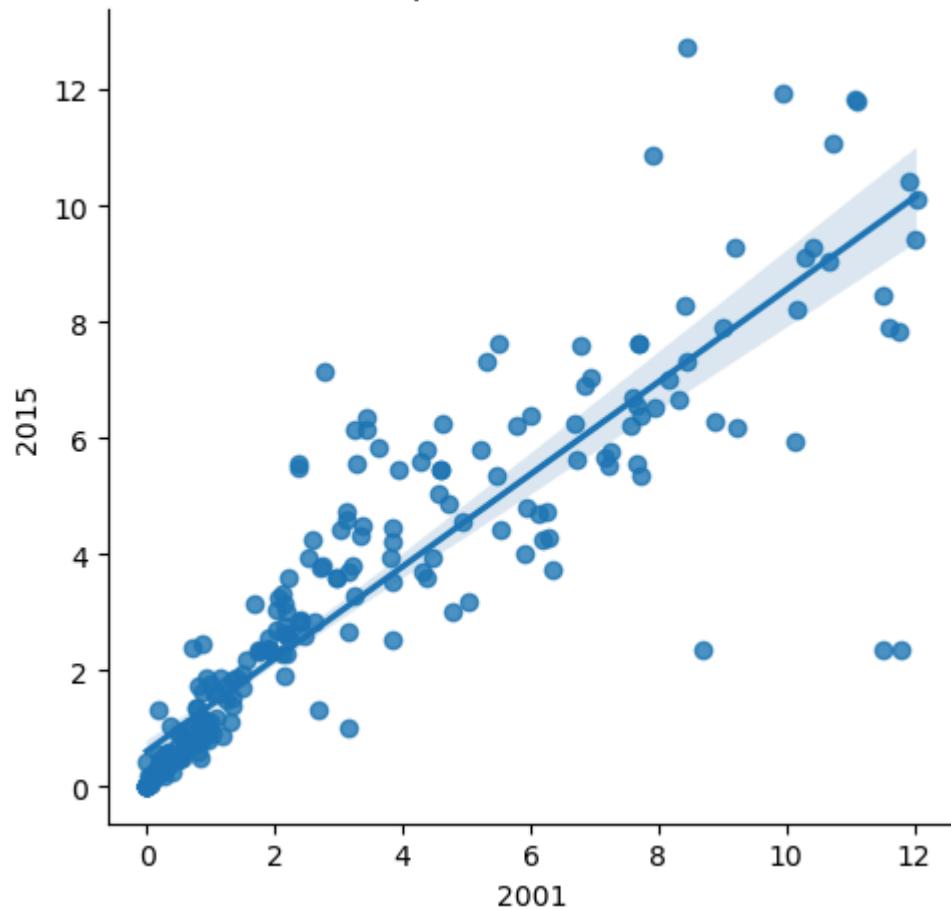
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2014

Corelation between 2001 and 2014 : 0.8790546673977437

Corelation: Positively Corelated.

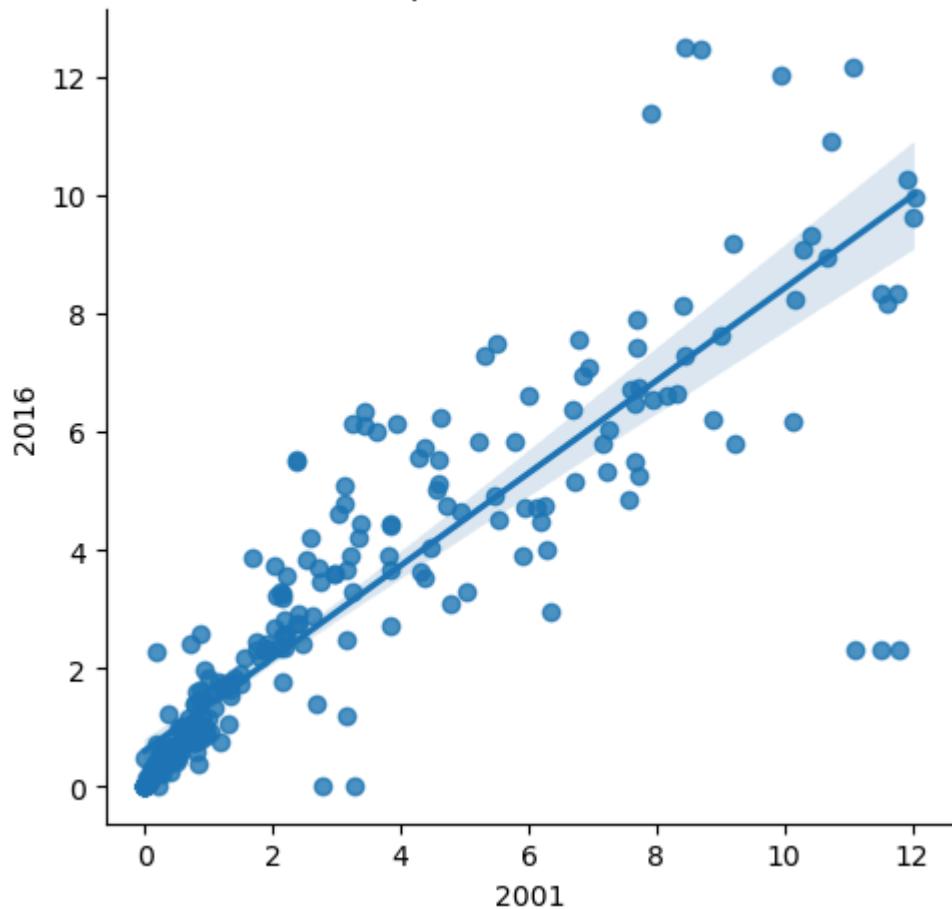
Scaterplot of 2001 vs 2015



Corelation between 2001 and 2015 : 0.8966829528612977

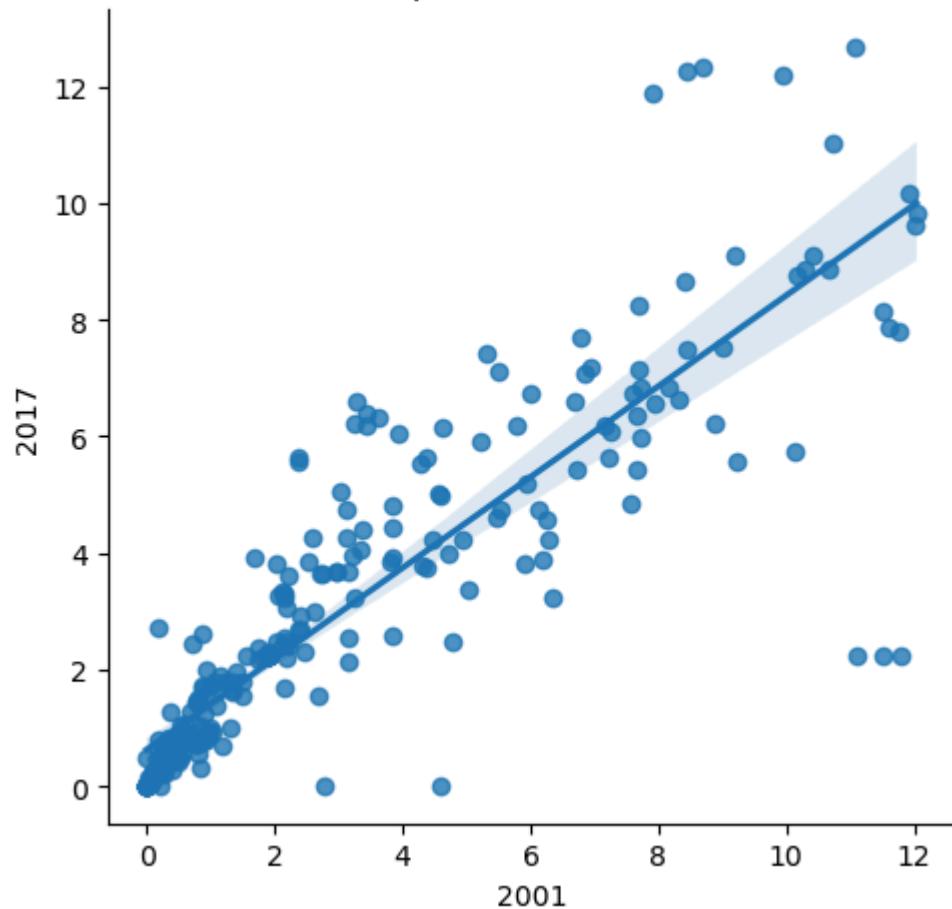
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2016



Corelation between 2001 and 2016 : 0.8831888939041787

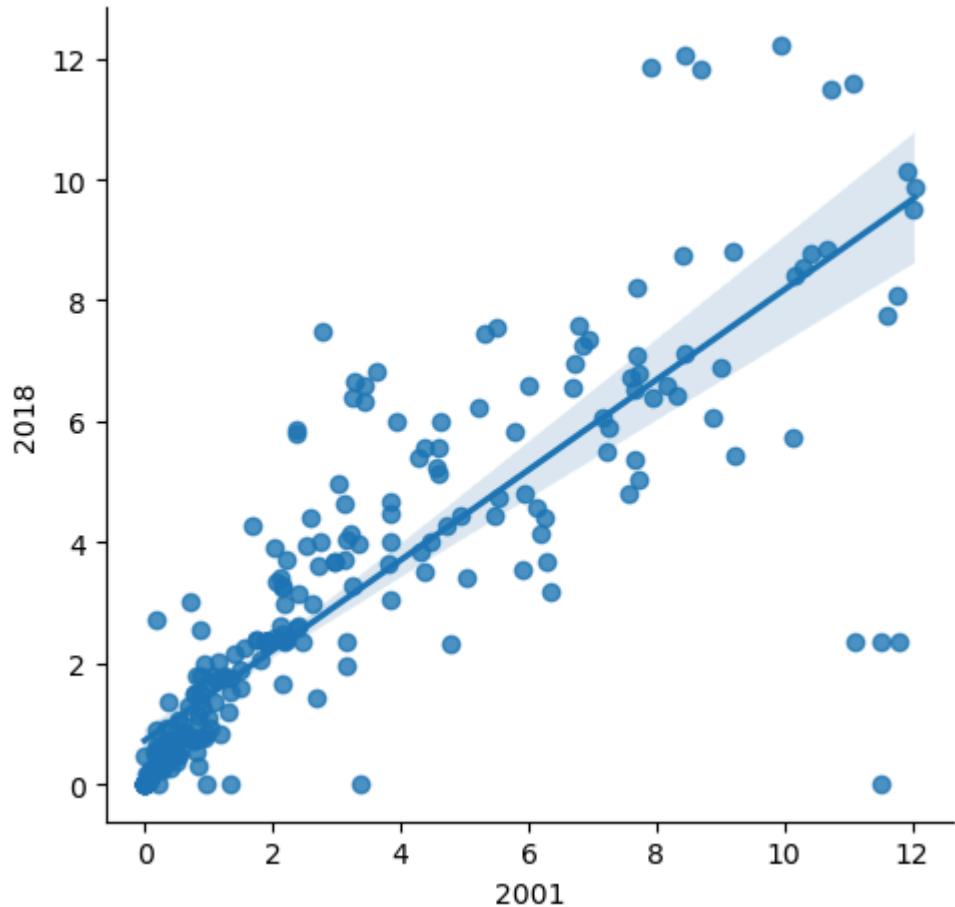
Corelation: Positively Corelated.

Scaterplot of 2001 vs 2017

Corelation between 2001 and 2017 : 0.8747866925119775

Corelation: Positively Corelated.

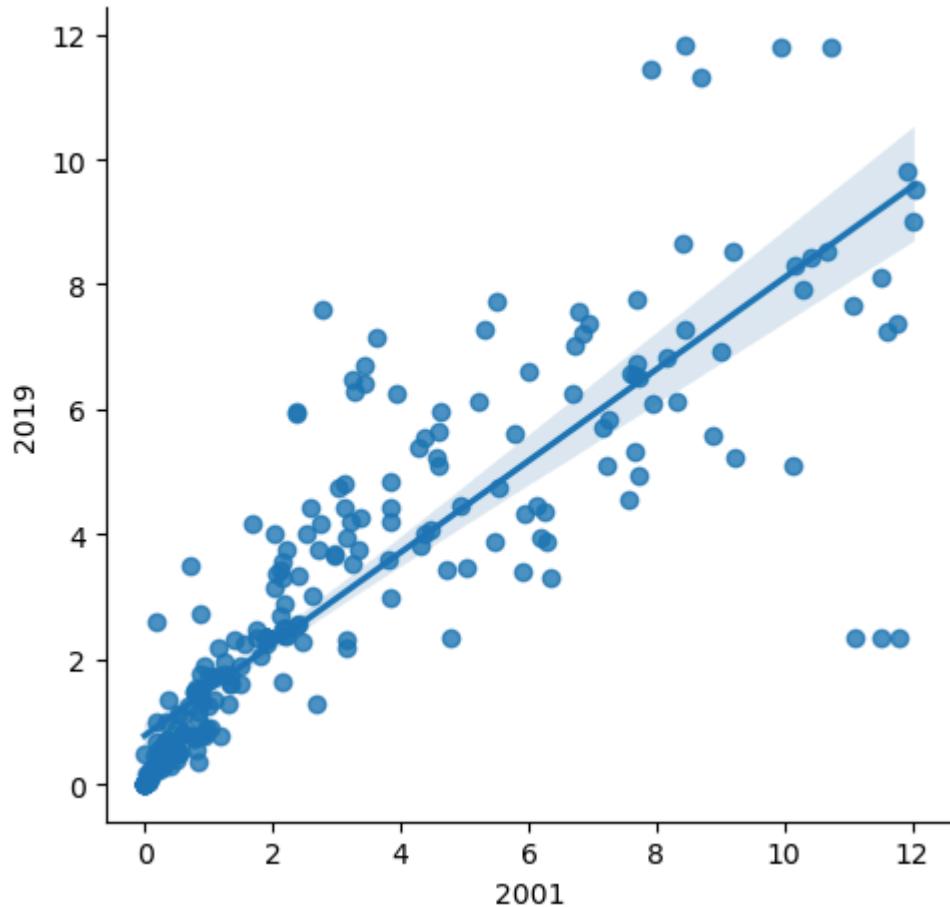
Scaterplot of 2001 vs 2018



Corelation between 2001 and 2018 : 0.8443424179031283

Corelation: Positively Corelated.

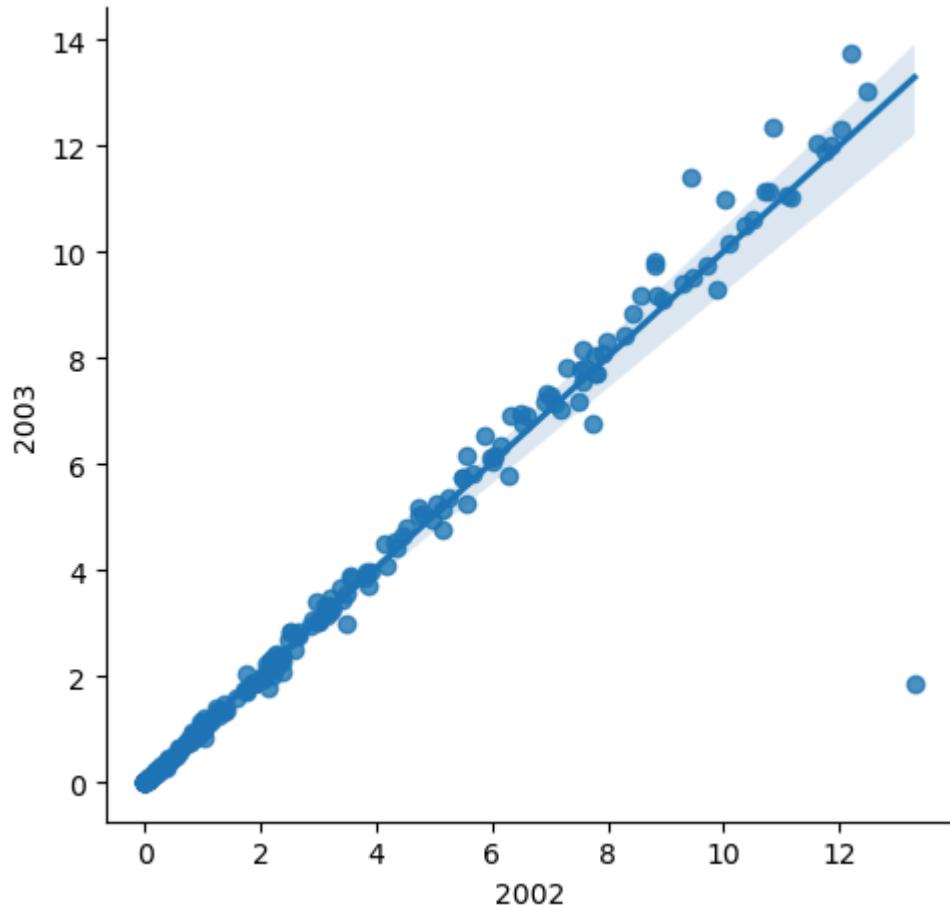
Scaterplot of 2001 vs 2019



Corelation between 2001 and 2019 : 0.8590796464775533

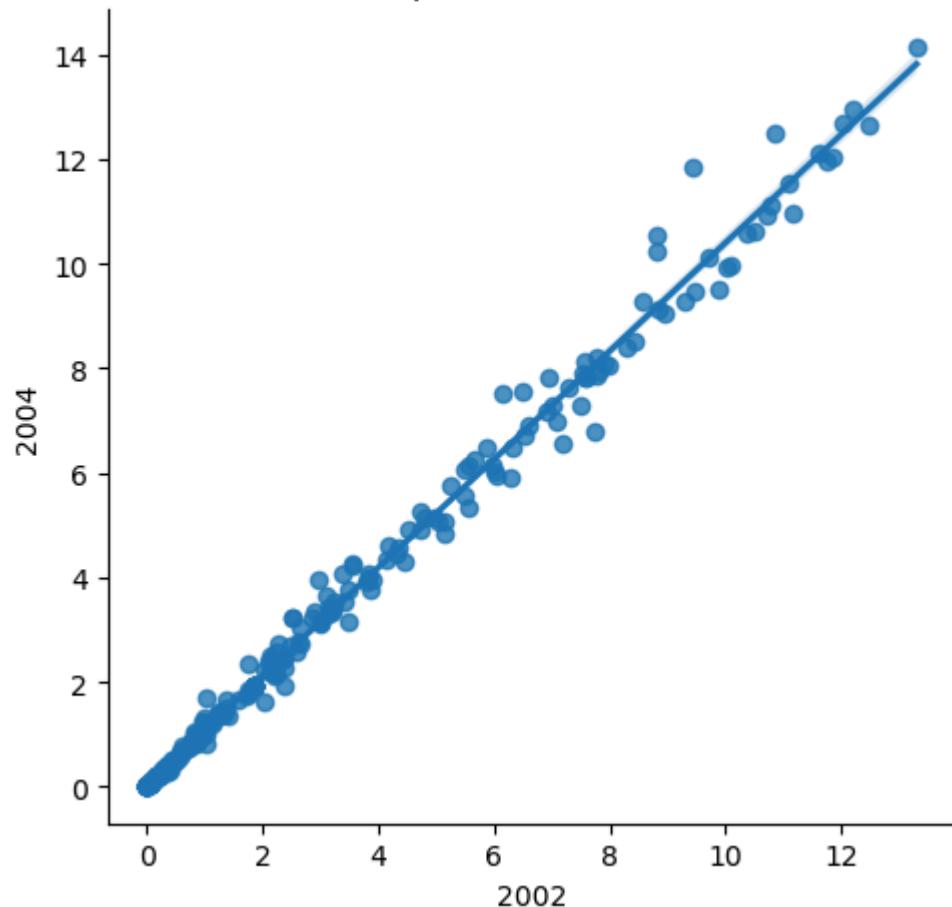
Corelation: Positively Corelated.

Scaterplot of 2002 vs 2003



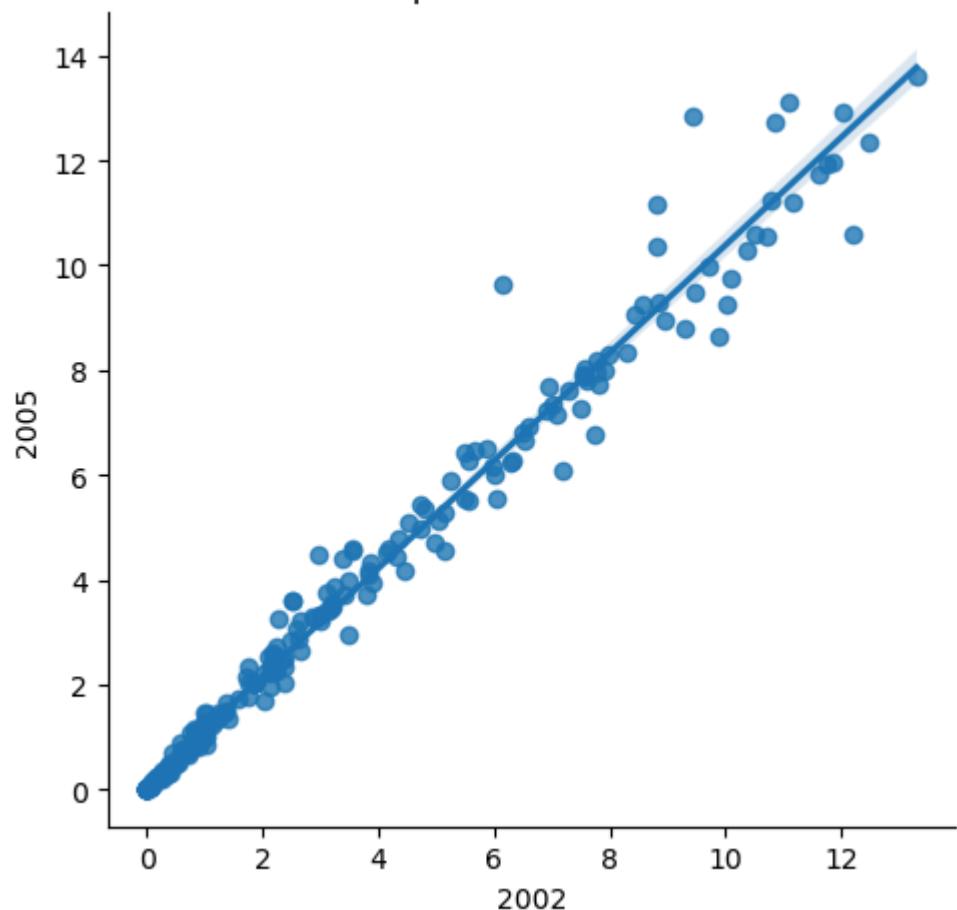
Corelation between 2002 and 2003 : 0.975279169981686

Corelation: Positively Corelated.

Scaterplot of 2002 vs 2004

Corelation between 2002 and 2004 : 0.9962613809931632

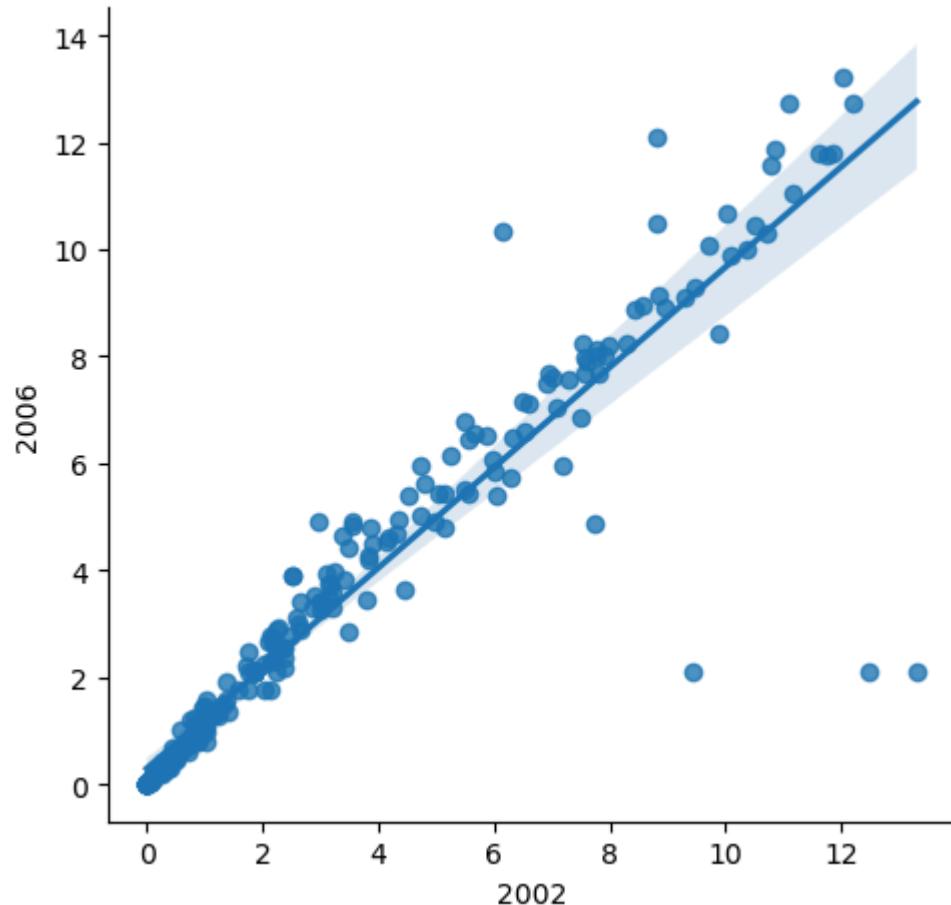
Corelation: Positively Corelated.

Scaterplot of 2002 vs 2005

Corelation between 2002 and 2005 : 0.9904906066774851

Corelation: Positively Corelated.

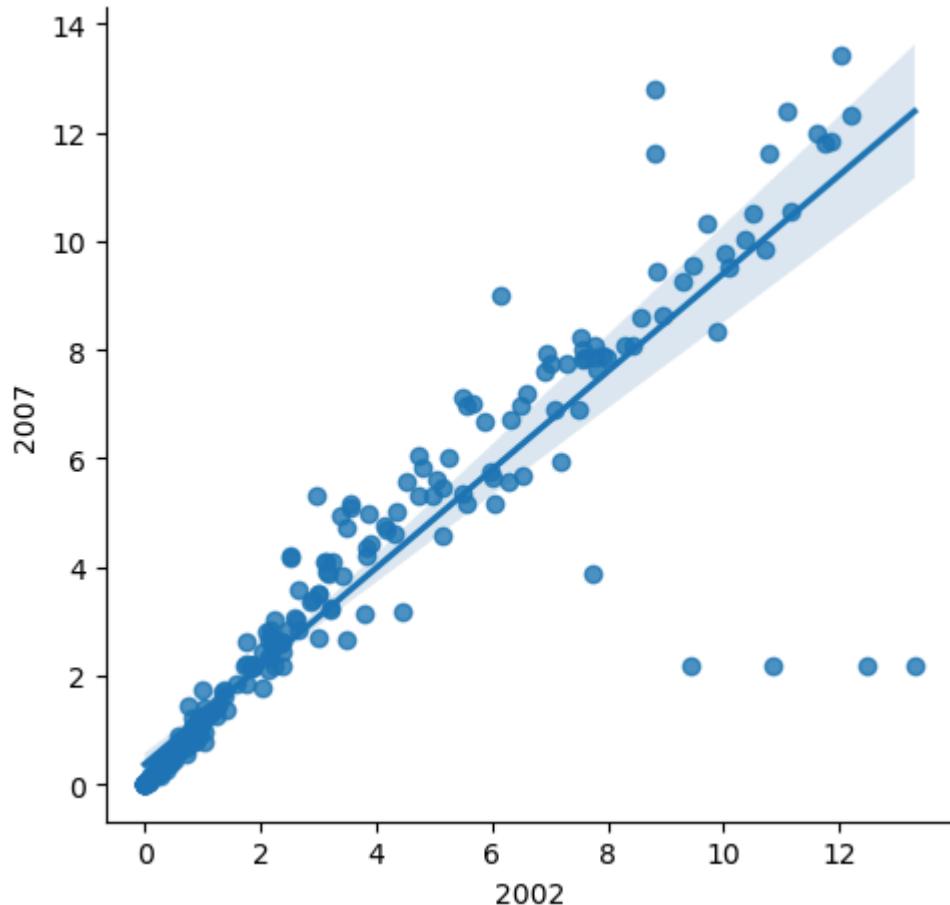
Scaterplot of 2002 vs 2006



Corelation between 2002 and 2006 : 0.9373349209445645

Corelation: Positively Corelated.

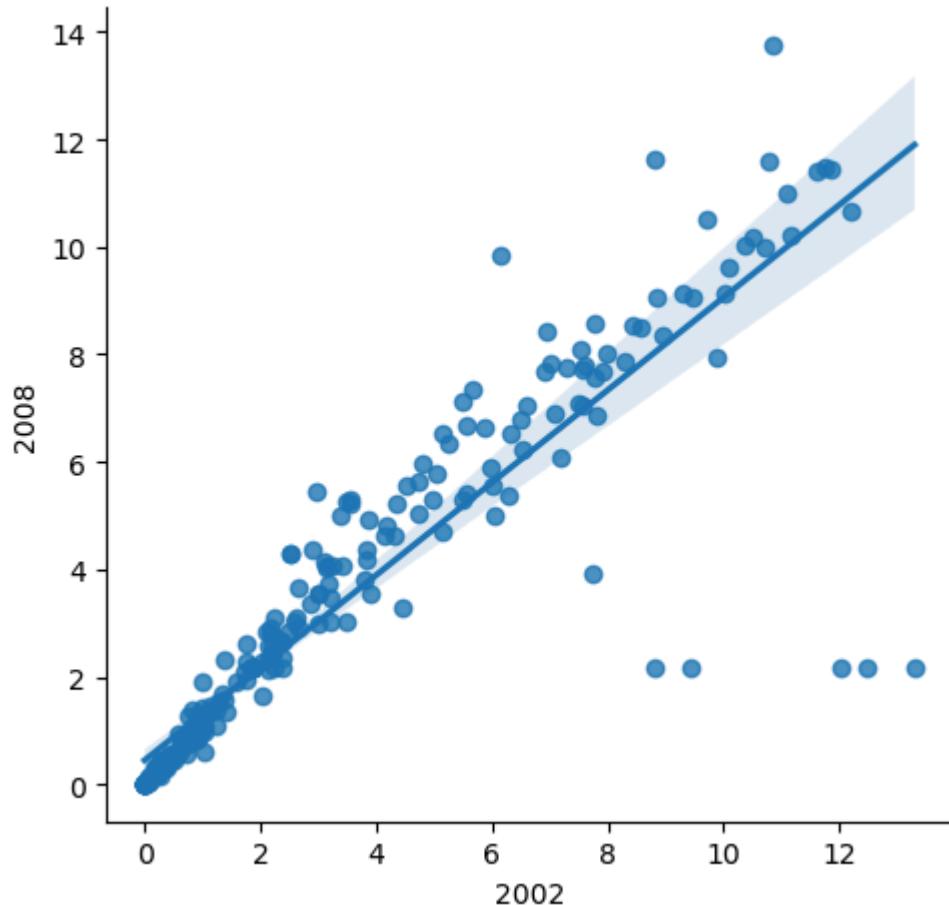
Scaterplot of 2002 vs 2007



Corelation between 2002 and 2007 : 0.9193984973898719

Corelation: Positively Corelated.

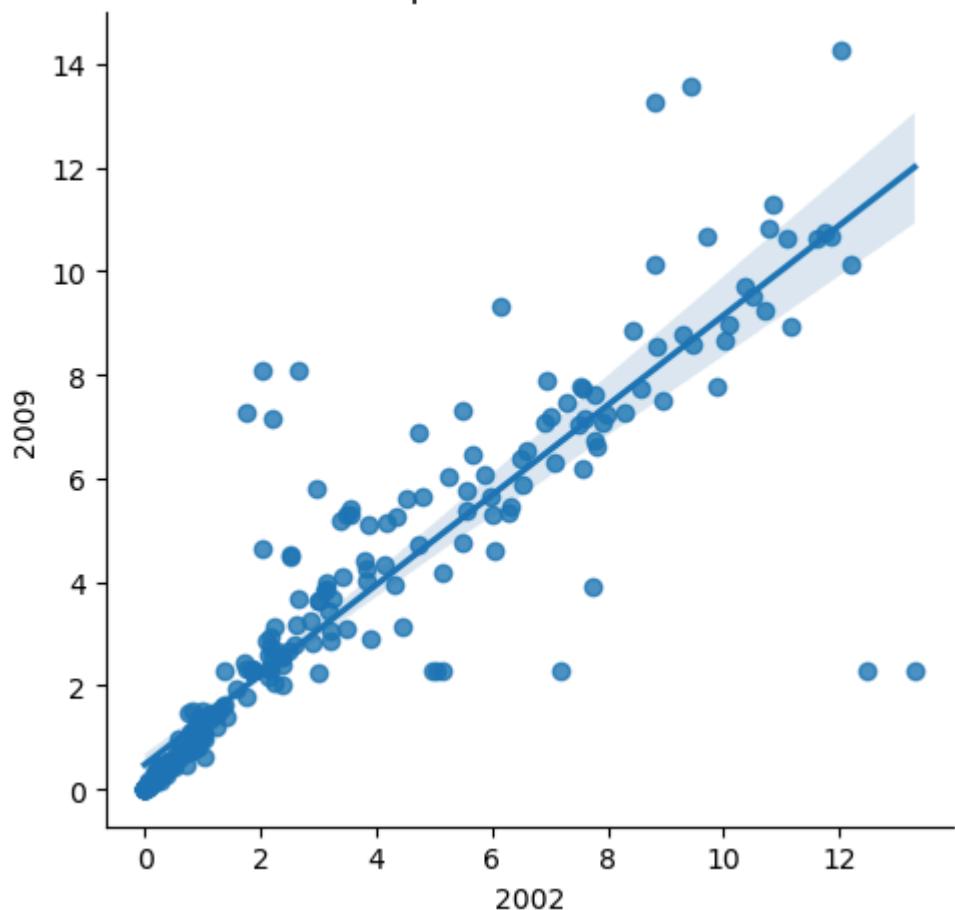
Scaterplot of 2002 vs 2008



Corelation between 2002 and 2008 : 0.9042310840225594

Corelation: Positively Corelated.

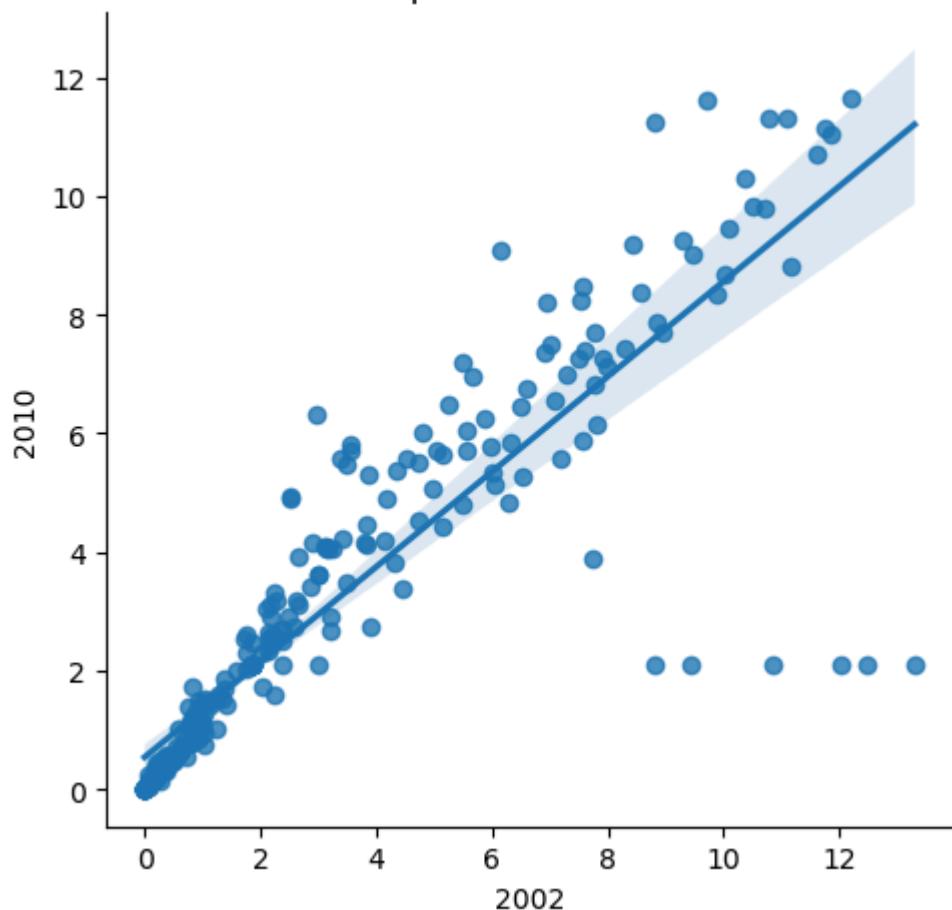
Scaterplot of 2002 vs 2009



Corelation between 2002 and 2009 : 0.900762021945166

Corelation: Positively Corelated.

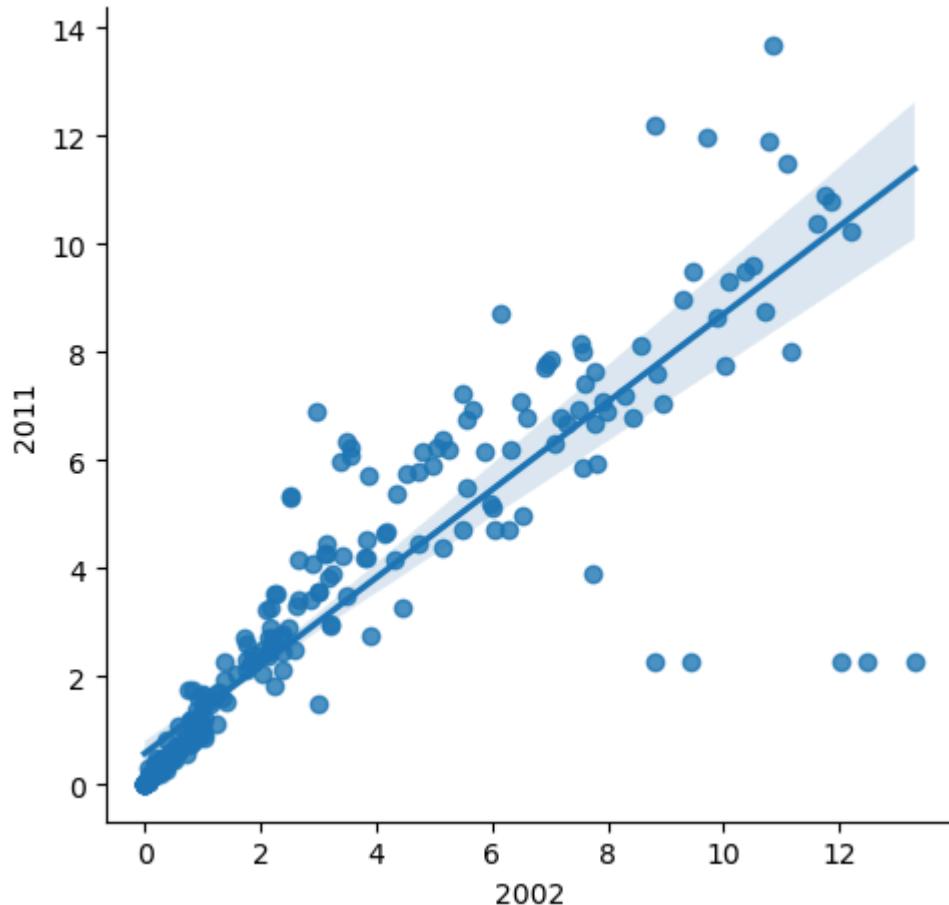
Scaterplot of 2002 vs 2010



Corelation between 2002 and 2010 : 0.8828939256064894

Corelation: Positively Corelated.

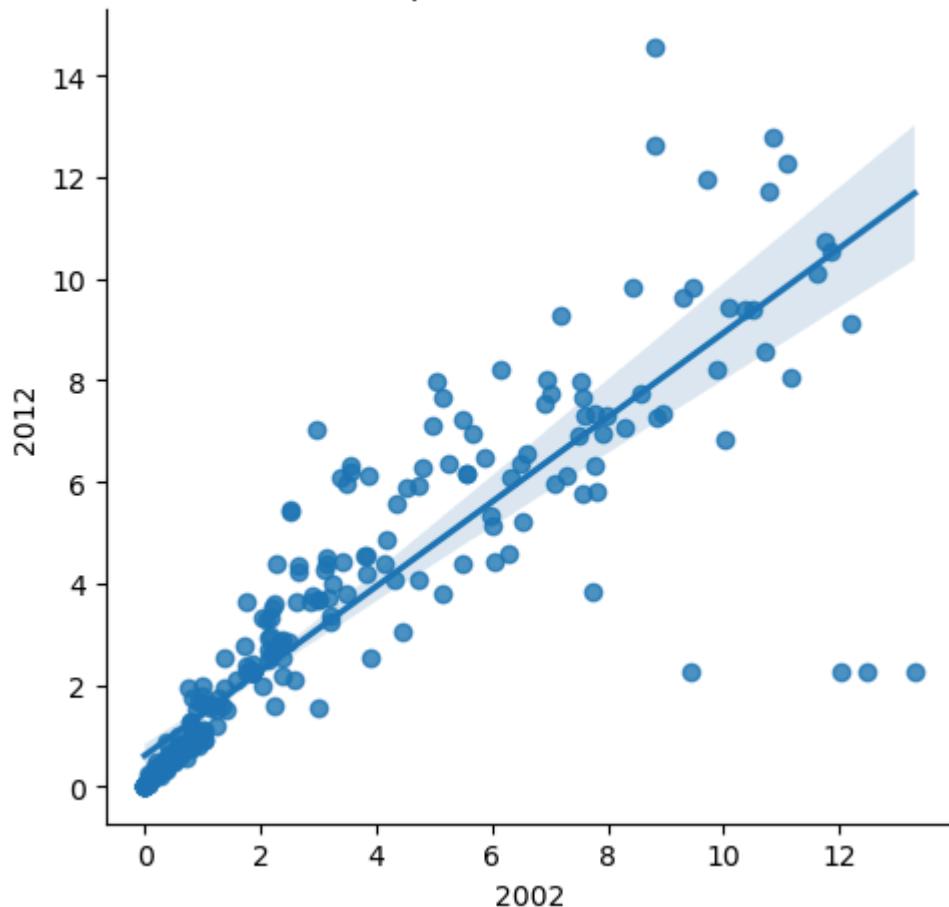
Scaterplot of 2002 vs 2011



Corelation between 2002 and 2011 : 0.886088001453116

Corelation: Positively Corelated.

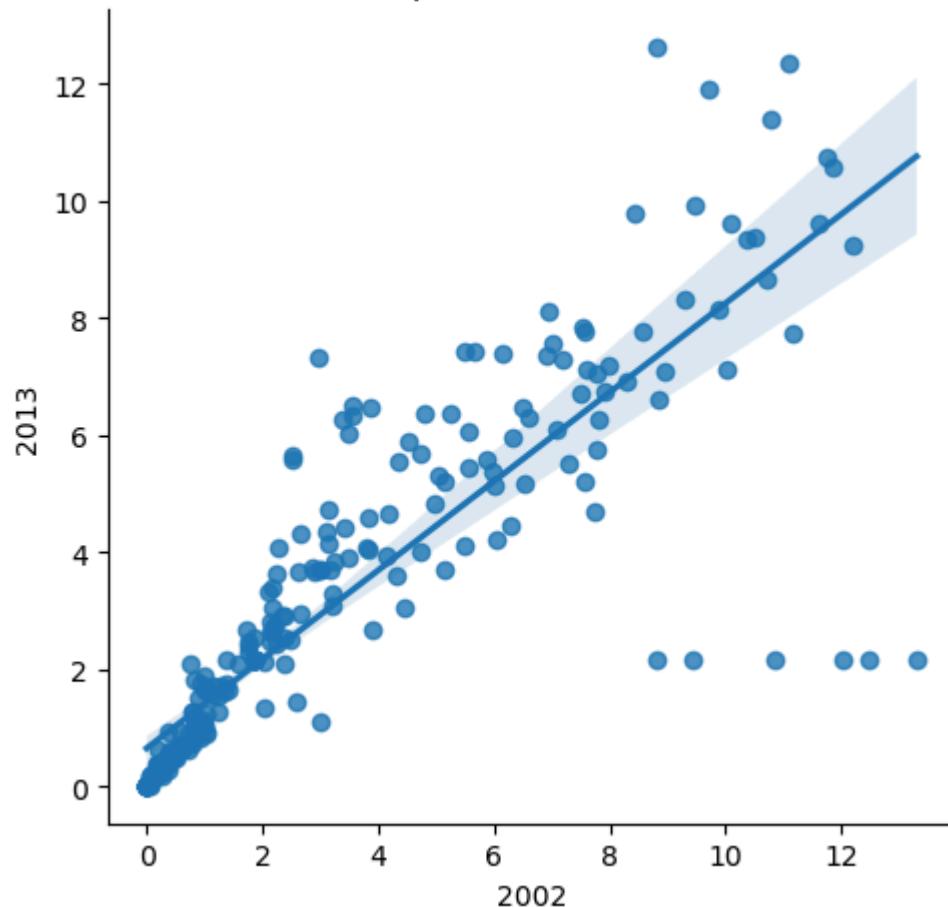
Scaterplot of 2002 vs 2012



Corelation between 2002 and 2012 : 0.8793077634156893

Corelation: Positively Corelated.

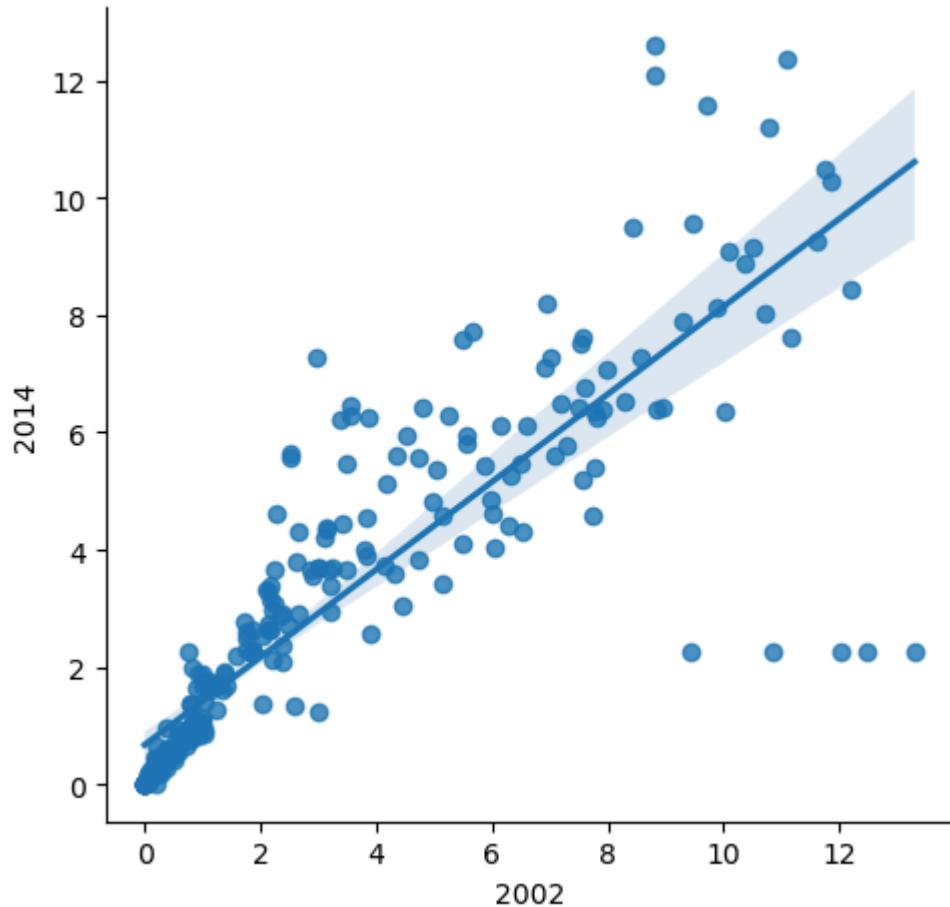
Scaterplot of 2002 vs 2013



Corelation between 2002 and 2013 : 0.862491850221509

Corelation: Positively Corelated.

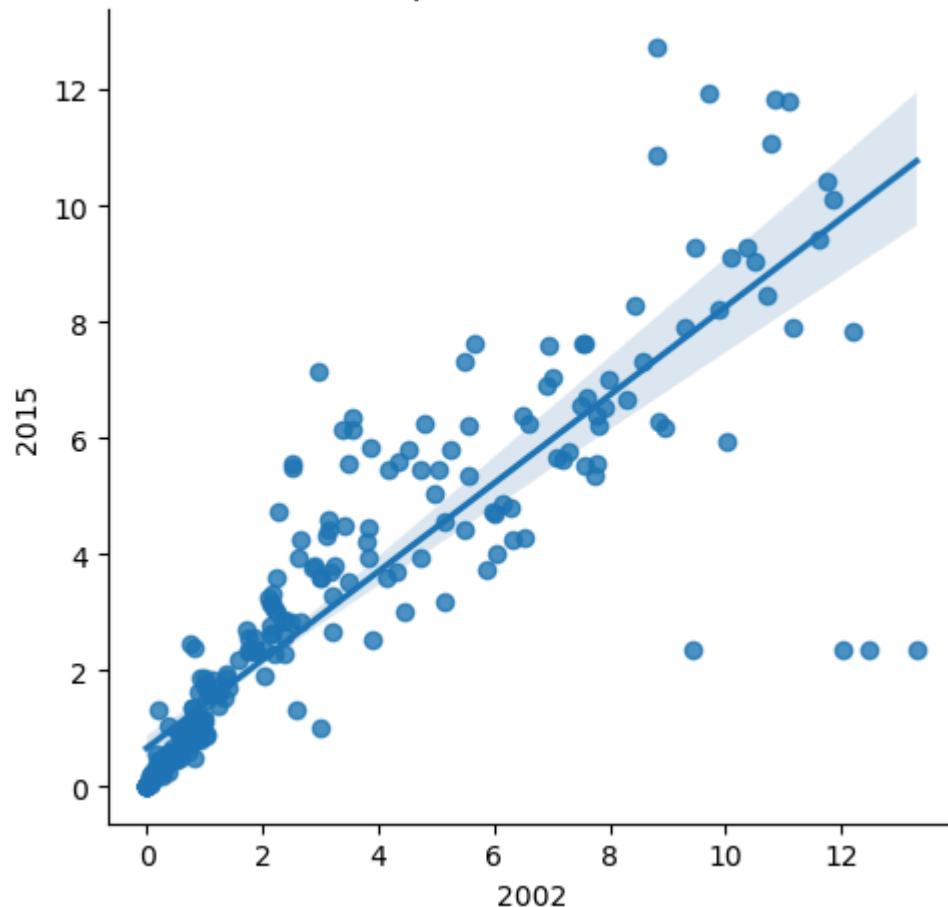
Scaterplot of 2002 vs 2014



Corelation between 2002 and 2014 : 0.8622696024573798

Corelation: Positively Corelated.

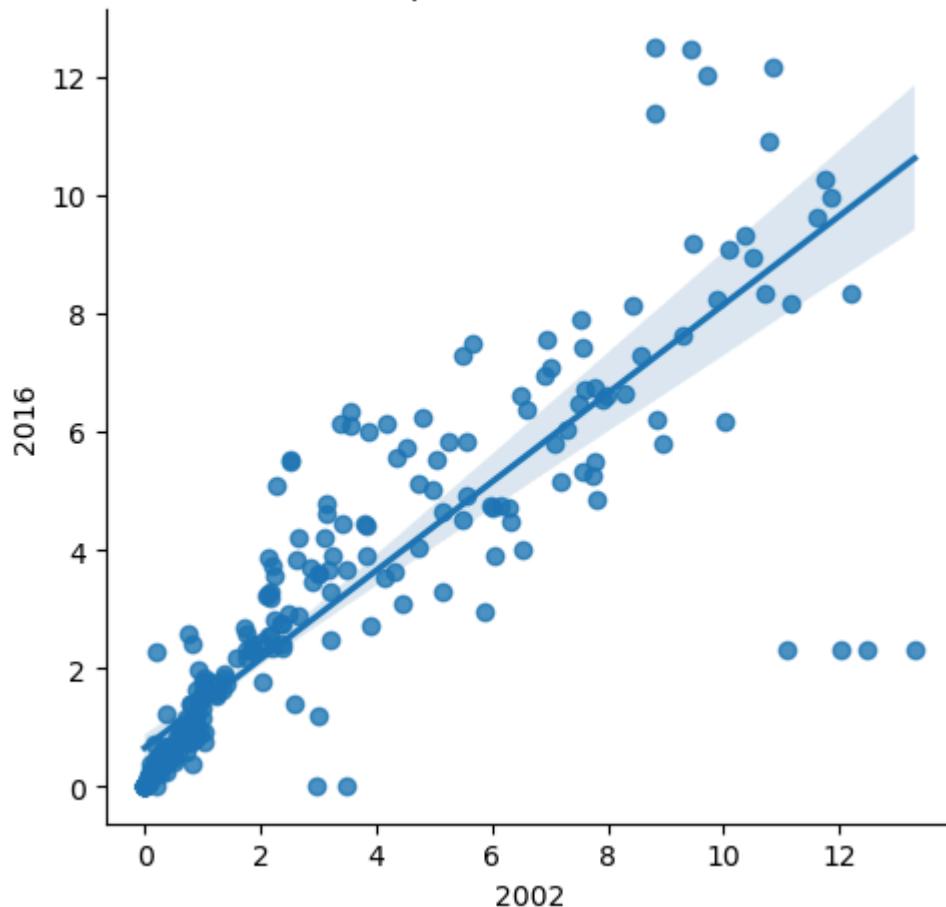
Scaterplot of 2002 vs 2015



Corelation between 2002 and 2015 : 0.8776511002167698

Corelation: Positively Corelated.

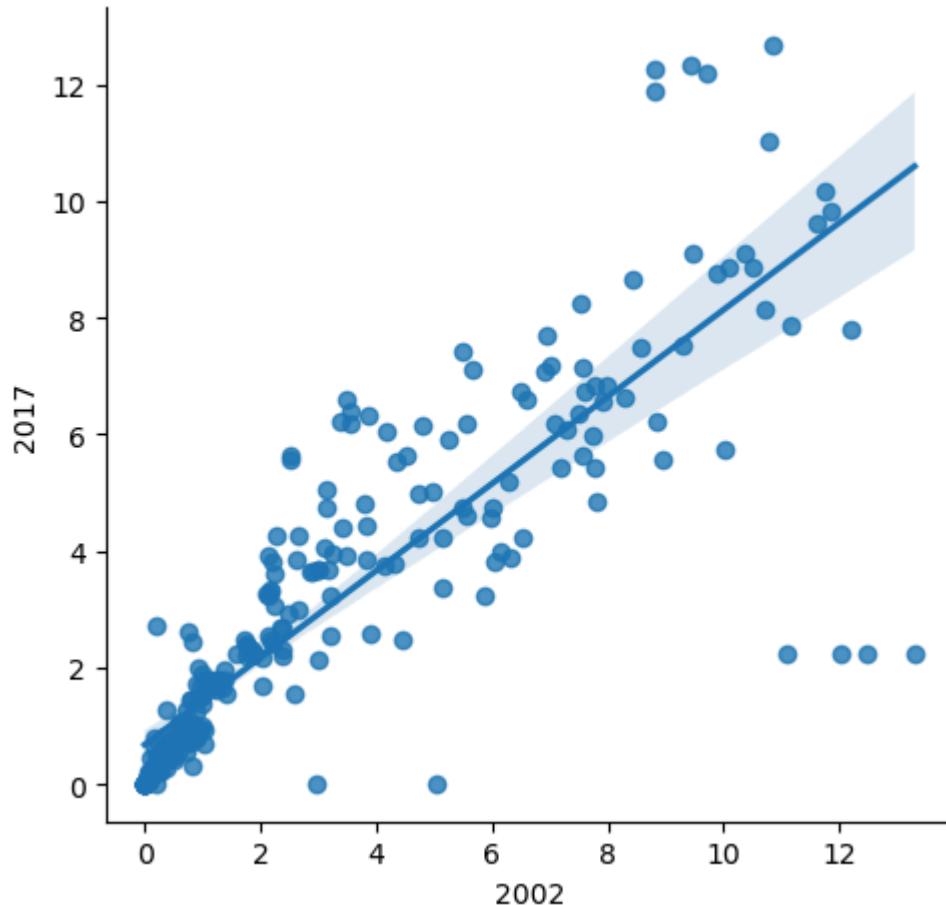
Scaterplot of 2002 vs 2016



Corelation between 2002 and 2016 : 0.8667279866505755

Corelation: Positively Corelated.

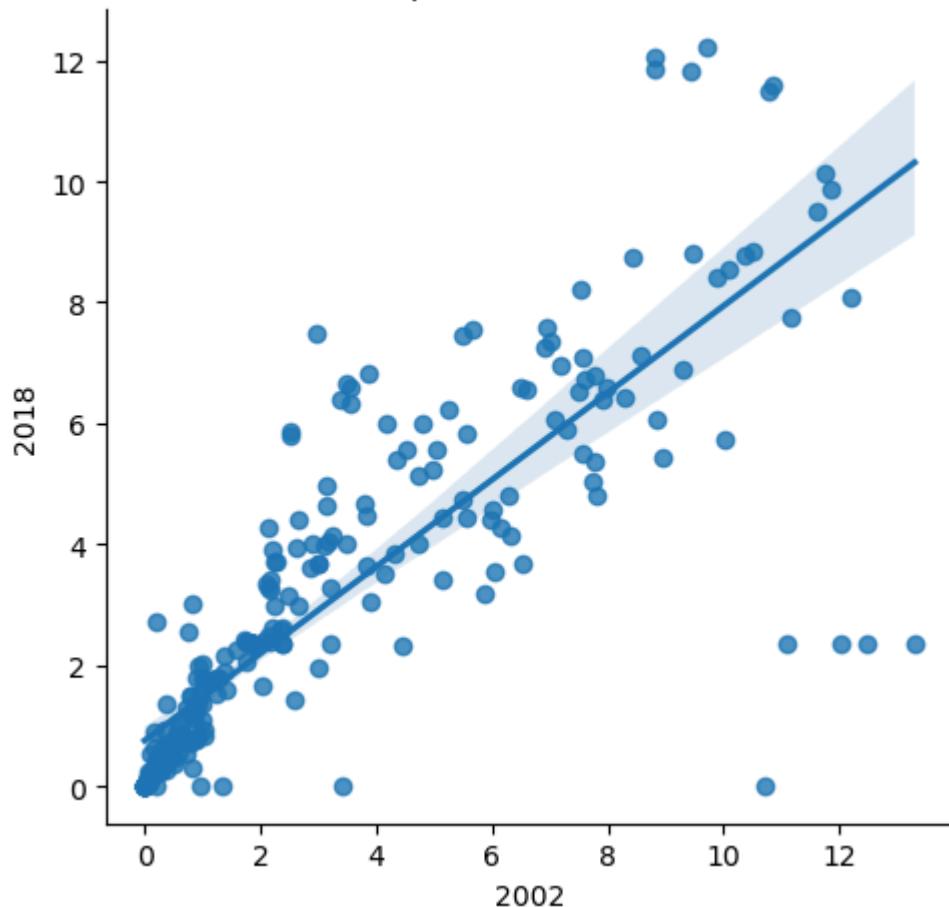
Scaterplot of 2002 vs 2017



Corelation between 2002 and 2017 : 0.8575380843527782

Corelation: Positively Corelated.

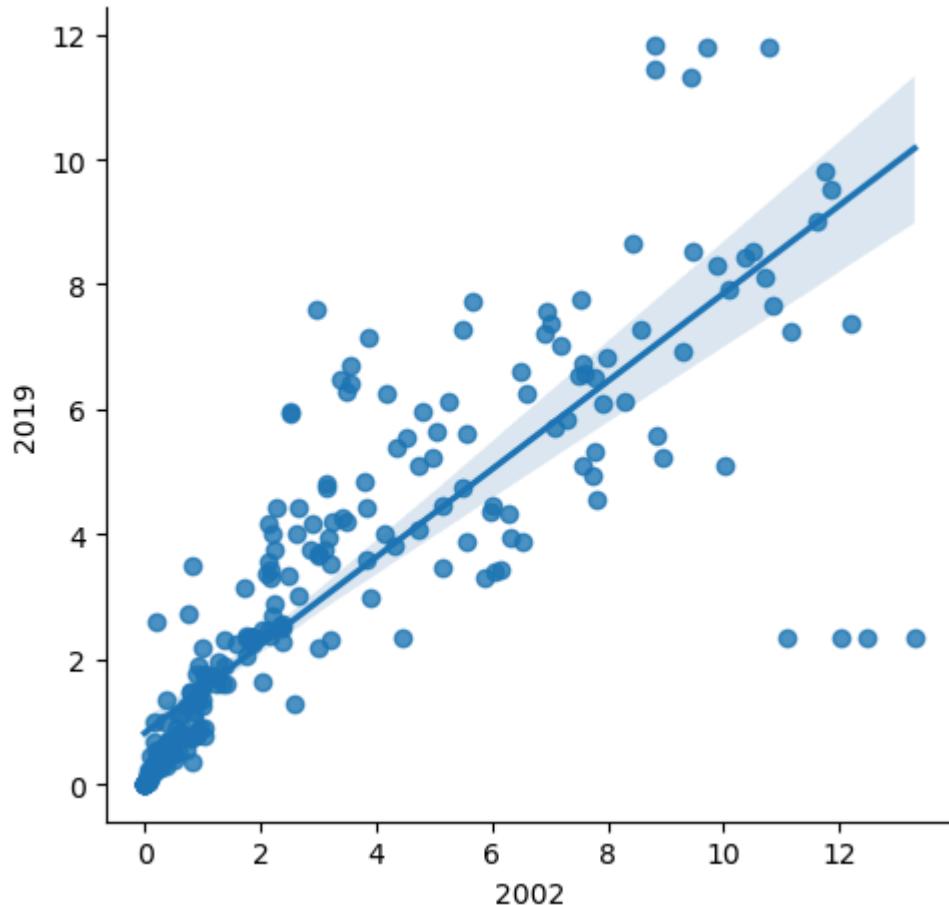
Scaterplot of 2002 vs 2018



Corelation between 2002 and 2018 : 0.8332530716128544

Corelation: Positively Corelated.

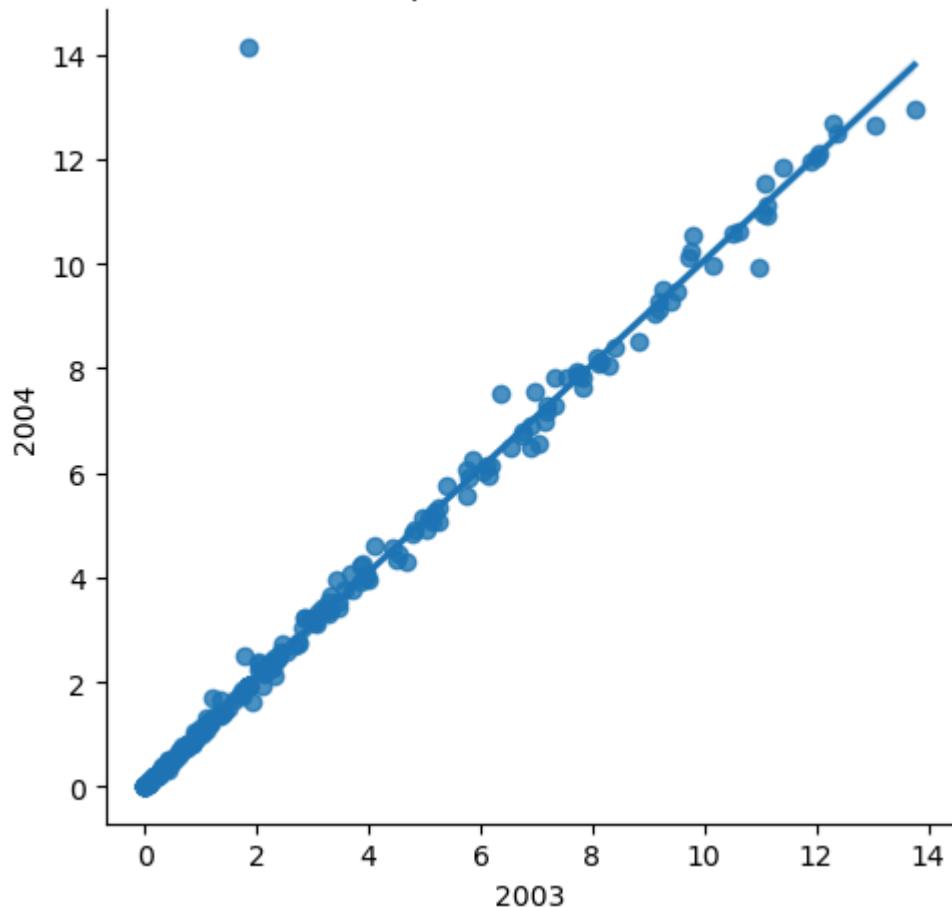
Scaterplot of 2002 vs 2019



Corelation between 2002 and 2019 : 0.8447351585707896

Corelation: Positively Corelated.

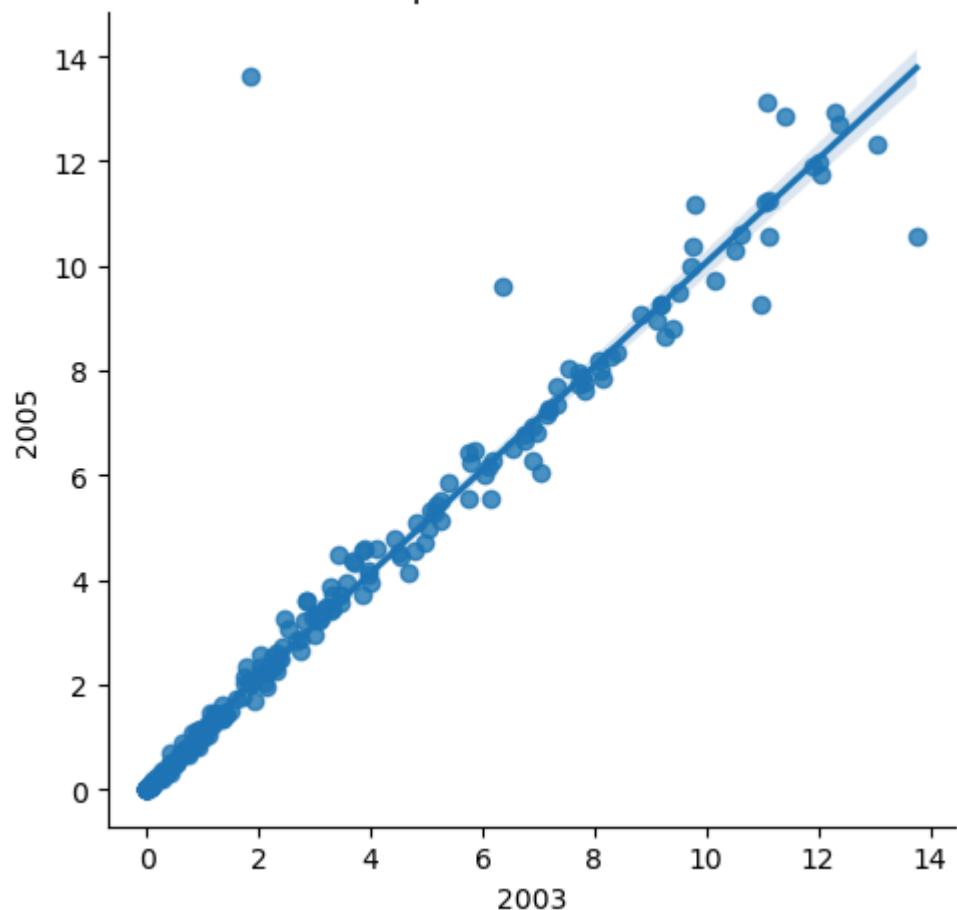
Scaterplot of 2003 vs 2004



Corelation between 2003 and 2004 : 0.9749993754486934

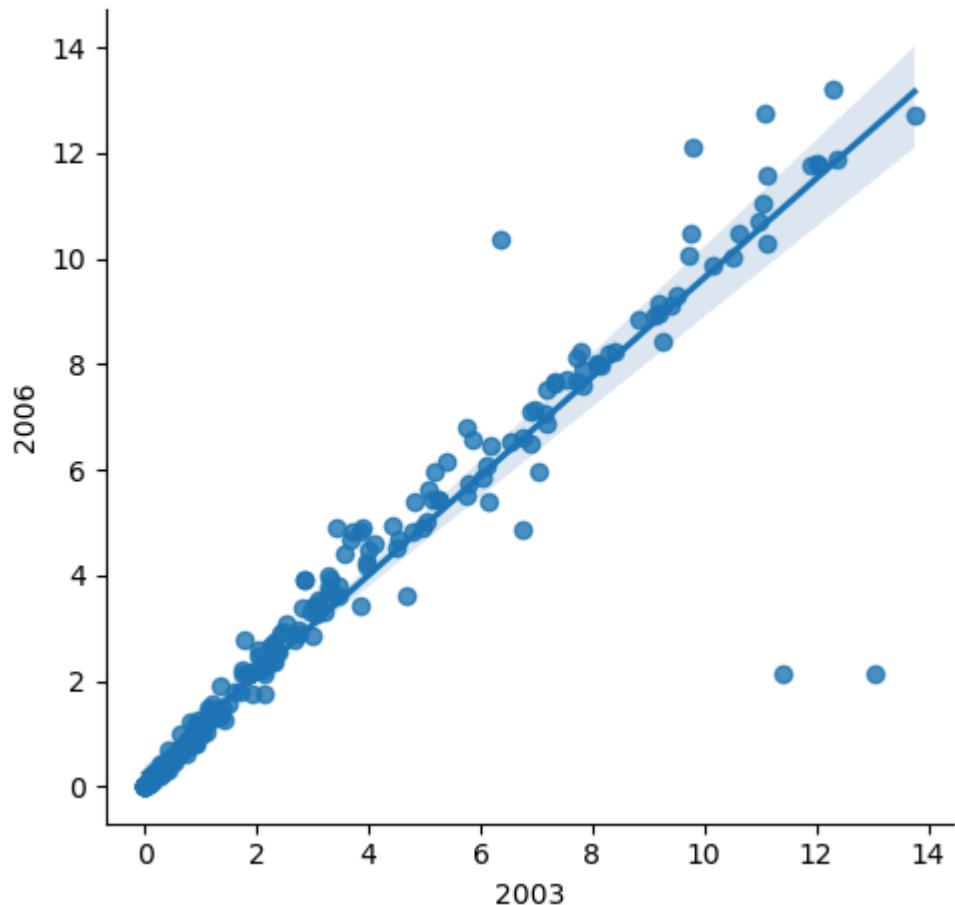
Corelation: Positively Corelated.

Scaterplot of 2003 vs 2005



Corelation between 2003 and 2005 : 0.9712562501055269

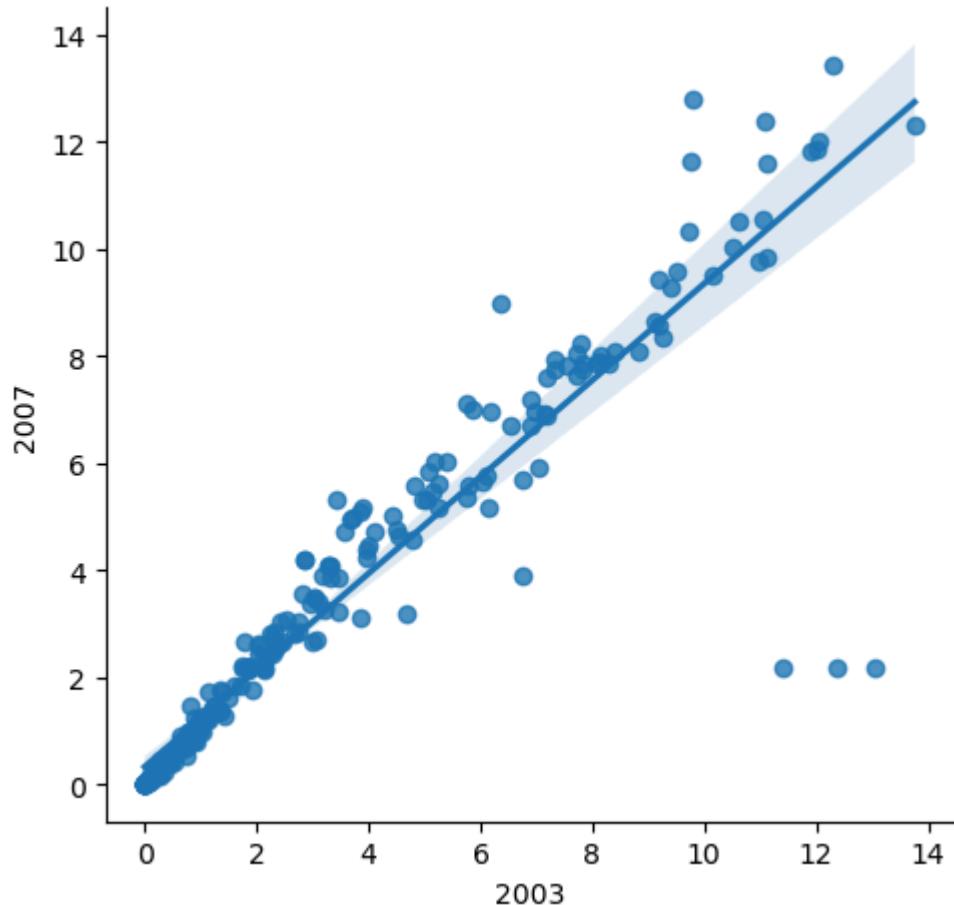
Corelation: Positively Corelated.

Scaterplot of 2003 vs 2006

Corelation between 2003 and 2006 : 0.9566495623792968

Corelation: Positively Corelated.

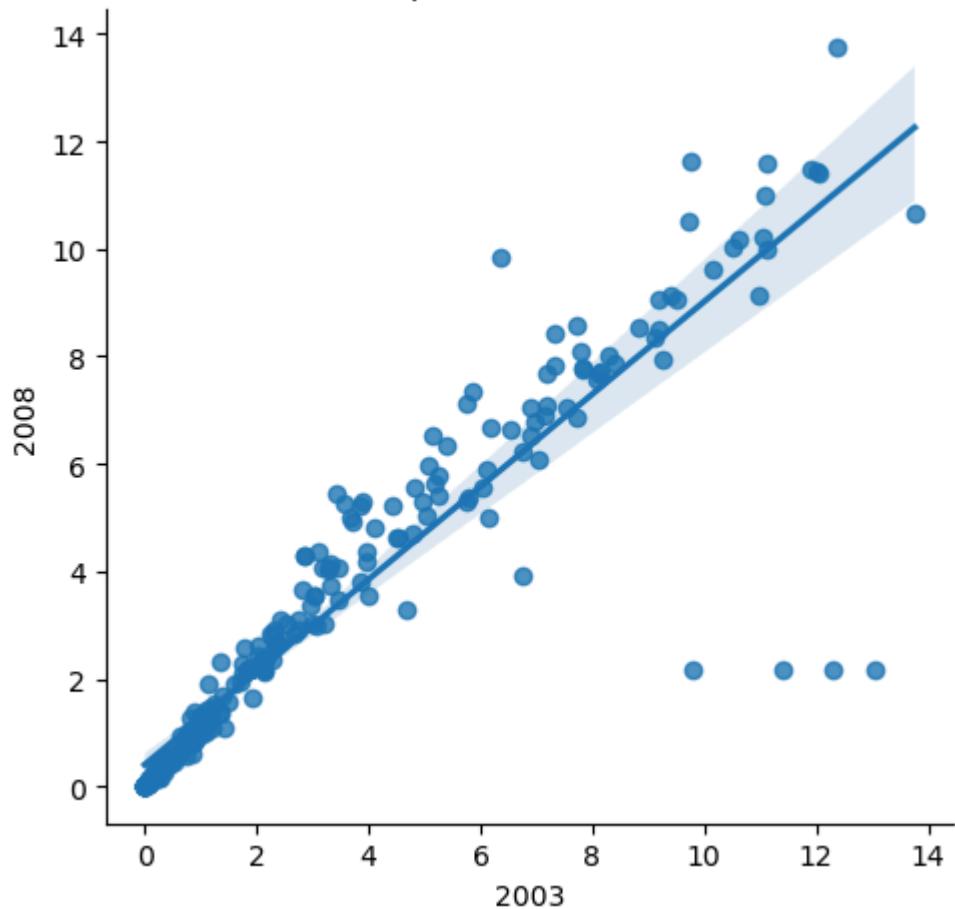
Scaterplot of 2003 vs 2007



Corelation between 2003 and 2007 : 0.9354563257809961

Corelation: Positively Corelated.

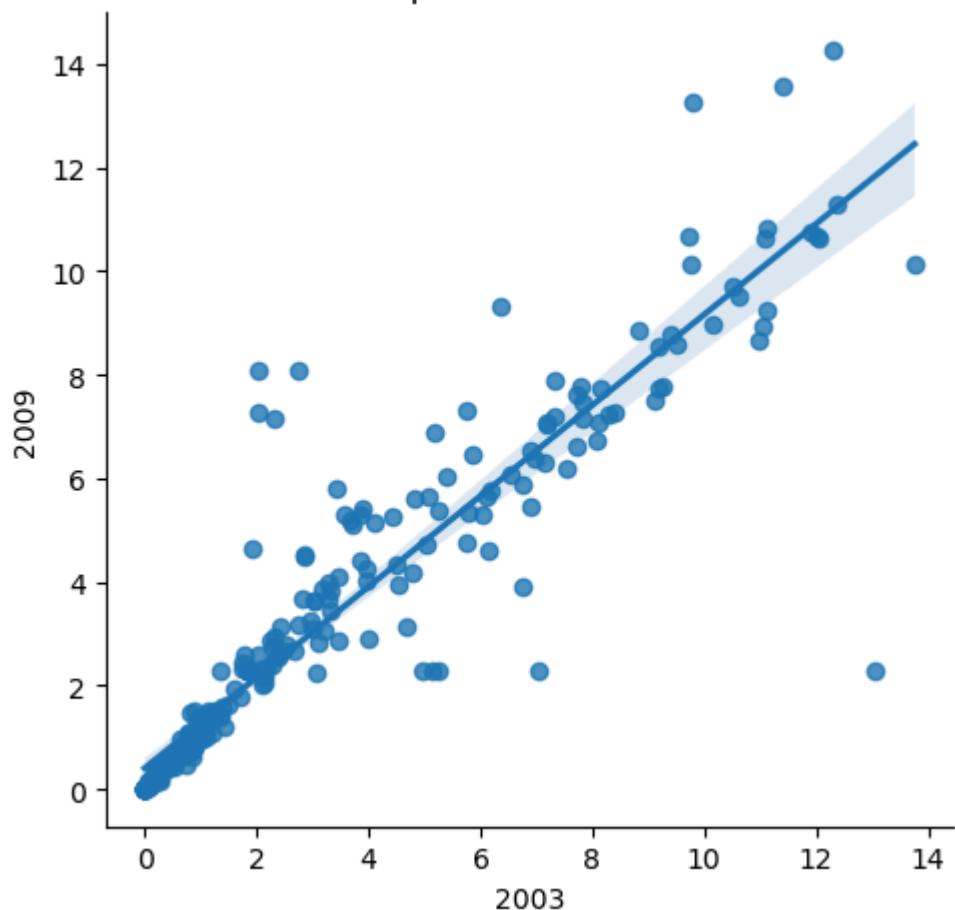
Scaterplot of 2003 vs 2008



Corelation between 2003 and 2008 : 0.9221485442238265

Corelation: Positively Corelated.

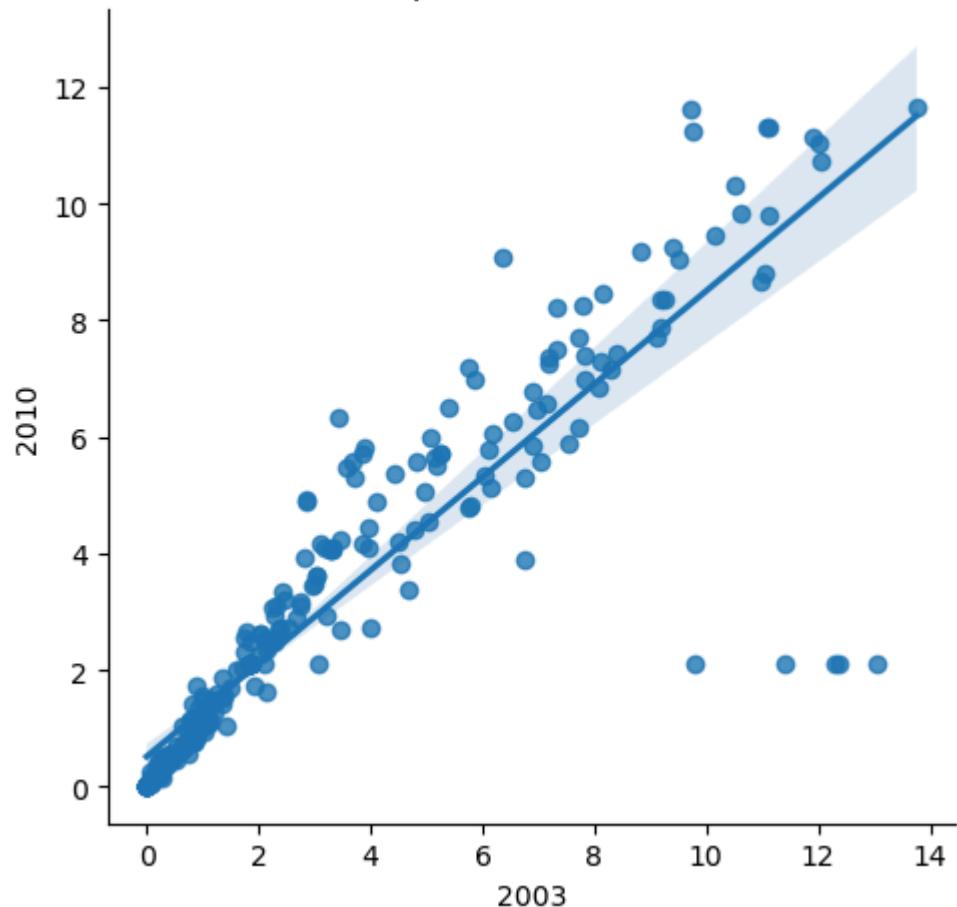
Scaterplot of 2003 vs 2009



Corelation between 2003 and 2009 : 0.9268644890053848

Corelation: Positively Corelated.

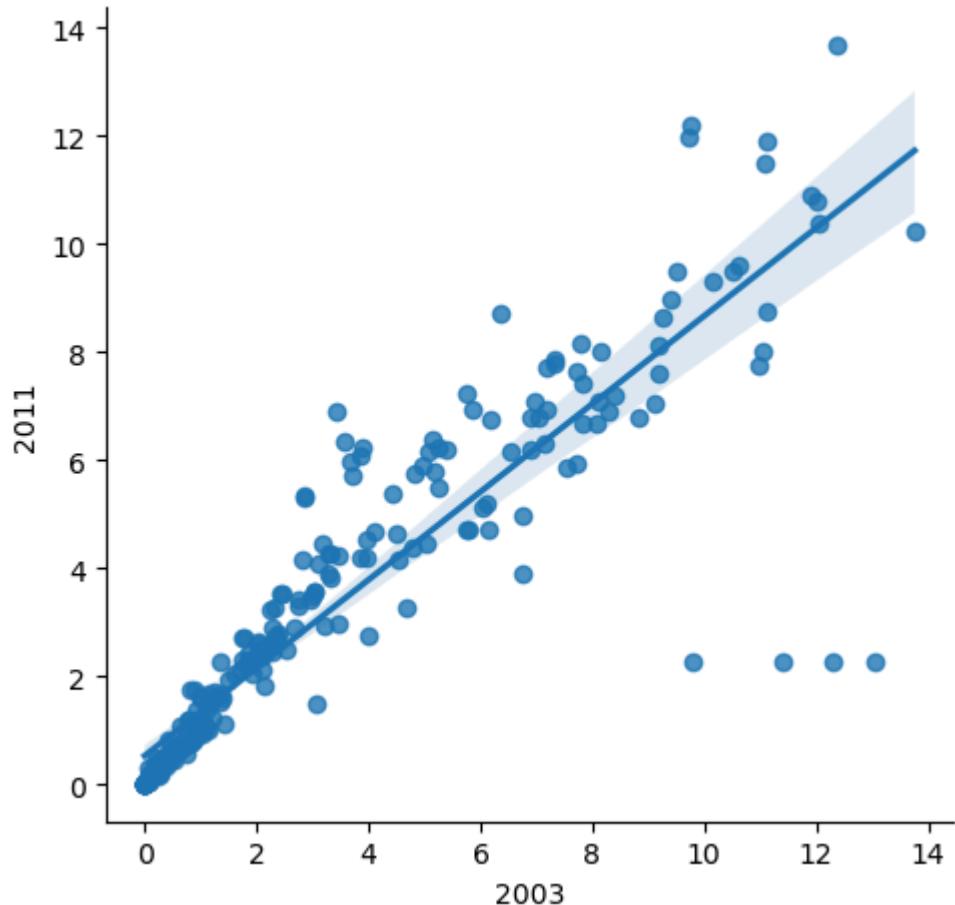
Scaterplot of 2003 vs 2010



Corelation between 2003 and 2010 : 0.8963554298098284

Corelation: Positively Corelated.

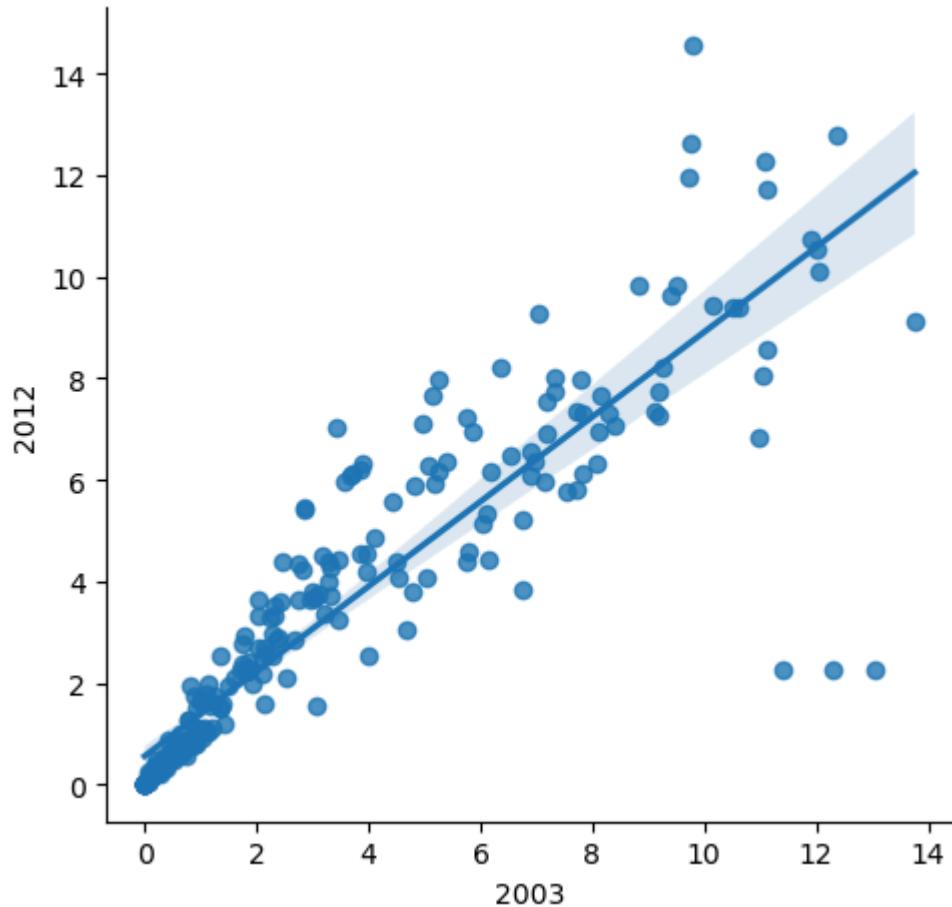
Scaterplot of 2003 vs 2011



Corelation between 2003 and 2011 : 0.9039485669874696

Corelation: Positively Corelated.

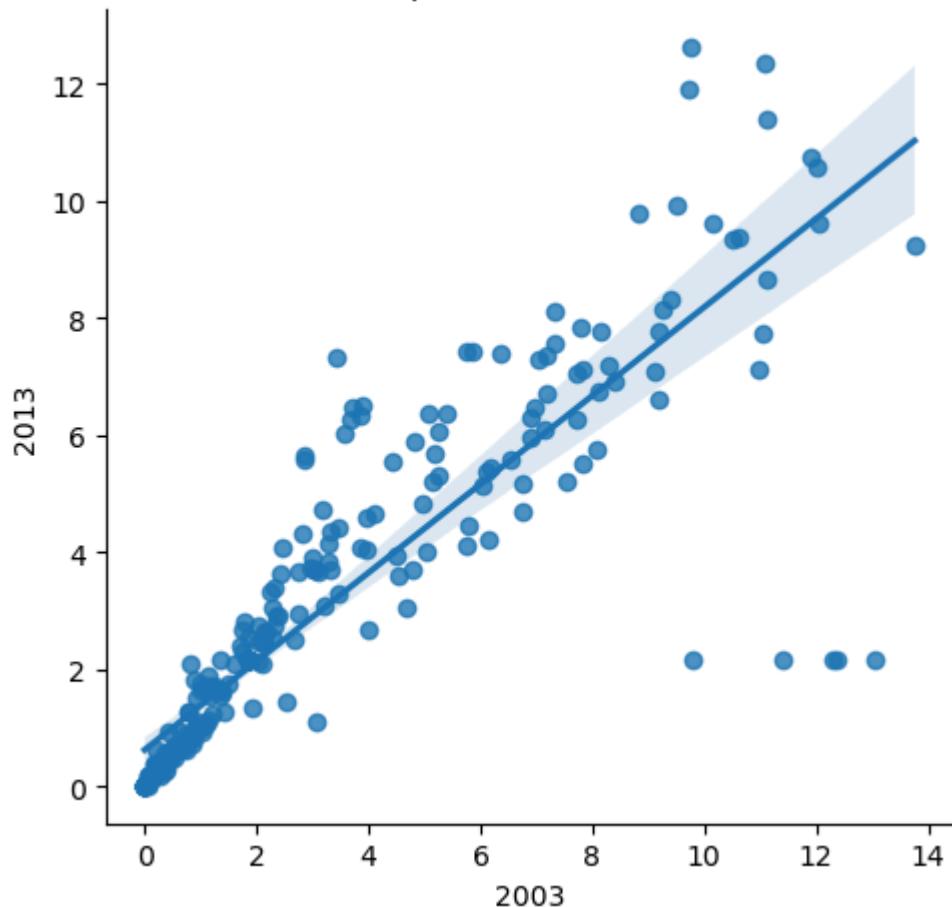
Scaterplot of 2003 vs 2012



Corelation between 2003 and 2012 : 0.8988101020238511

Corelation: Positively Corelated.

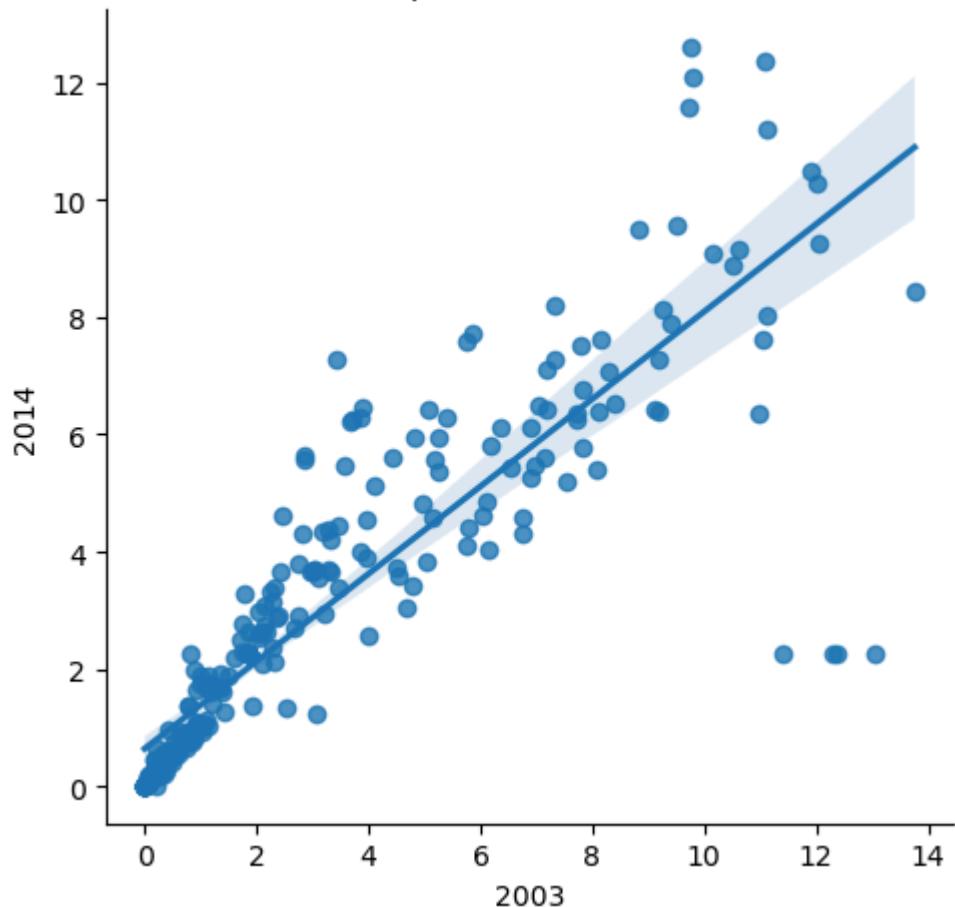
Scaterplot of 2003 vs 2013



Corelation between 2003 and 2013 : 0.874262759551181

Corelation: Positively Corelated.

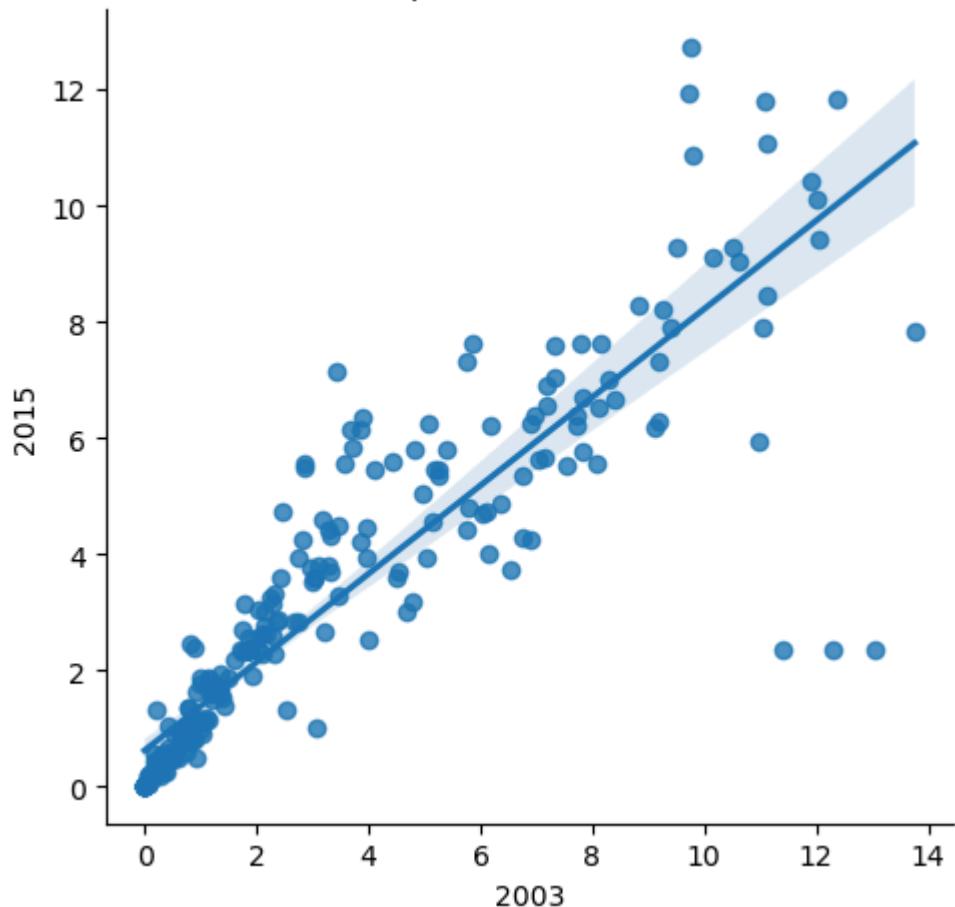
Scaterplot of 2003 vs 2014



Corelation between 2003 and 2014 : 0.8762154270982596

Corelation: Positively Corelated.

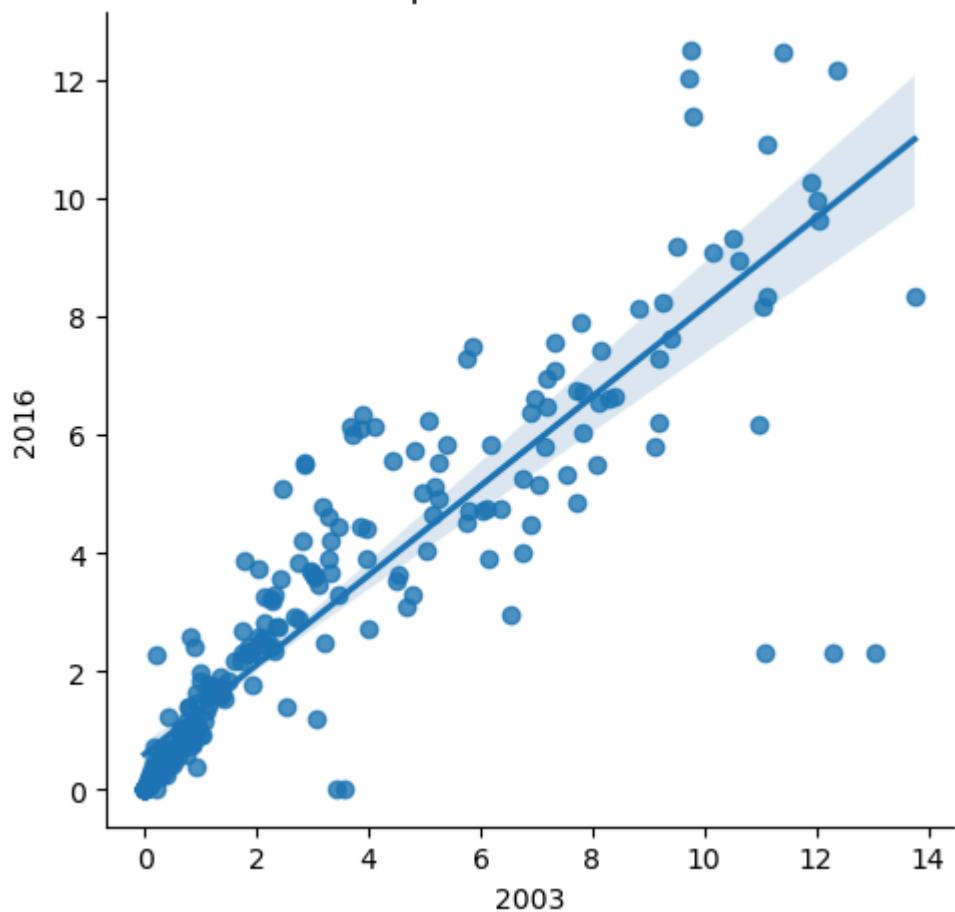
Scaterplot of 2003 vs 2015



Corelation between 2003 and 2015 : 0.8944527909092199

Corelation: Positively Corelated.

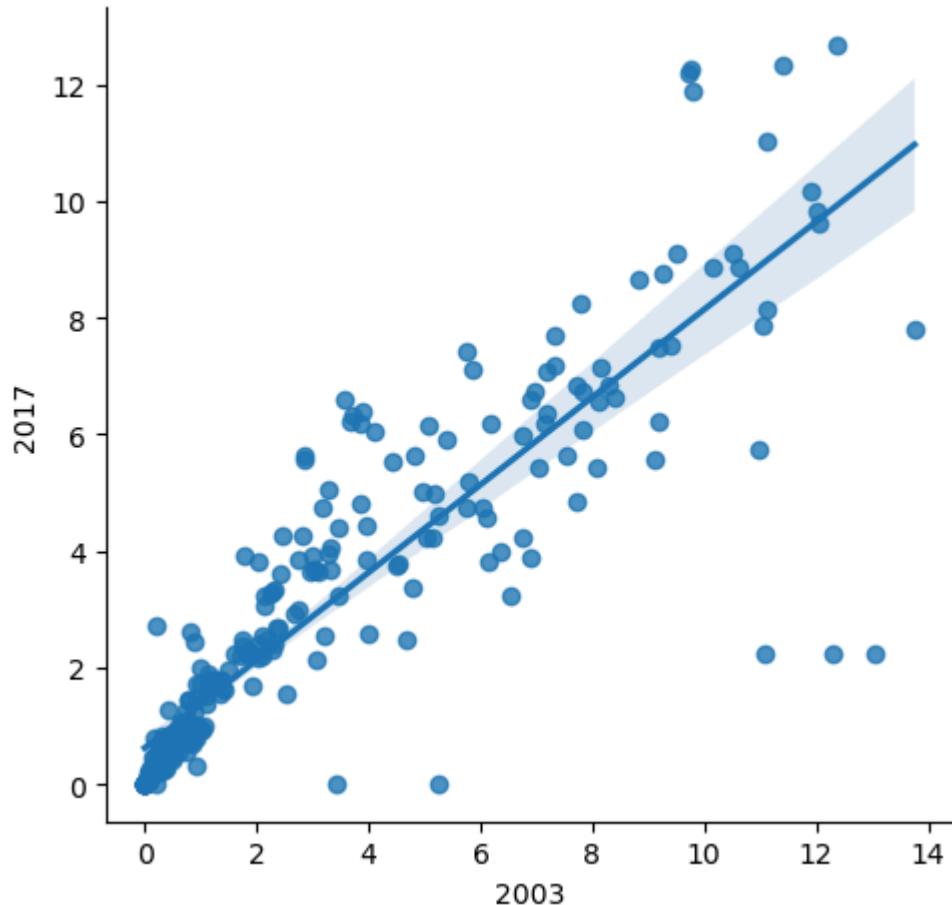
Scaterplot of 2003 vs 2016



Corelation between 2003 and 2016 : 0.8907428065135955

Corelation: Positively Corelated.

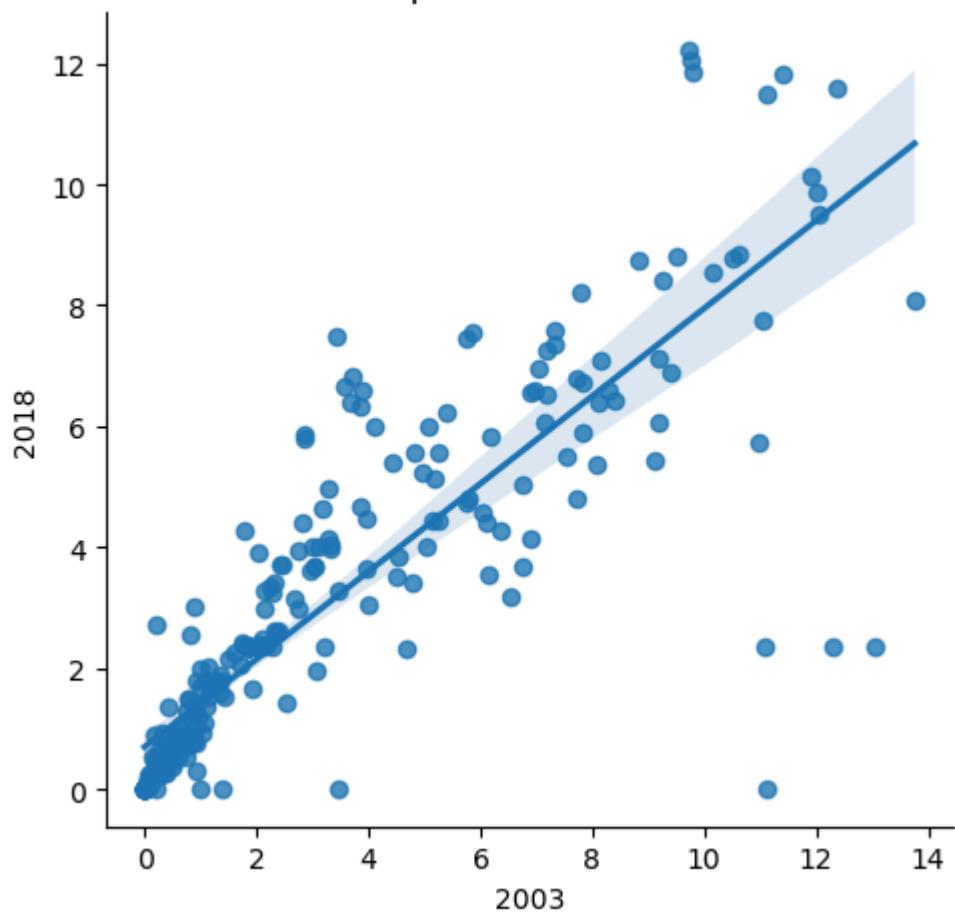
Scaterplot of 2003 vs 2017



Corelation between 2003 and 2017 : 0.881155155179982

Corelation: Positively Corelated.

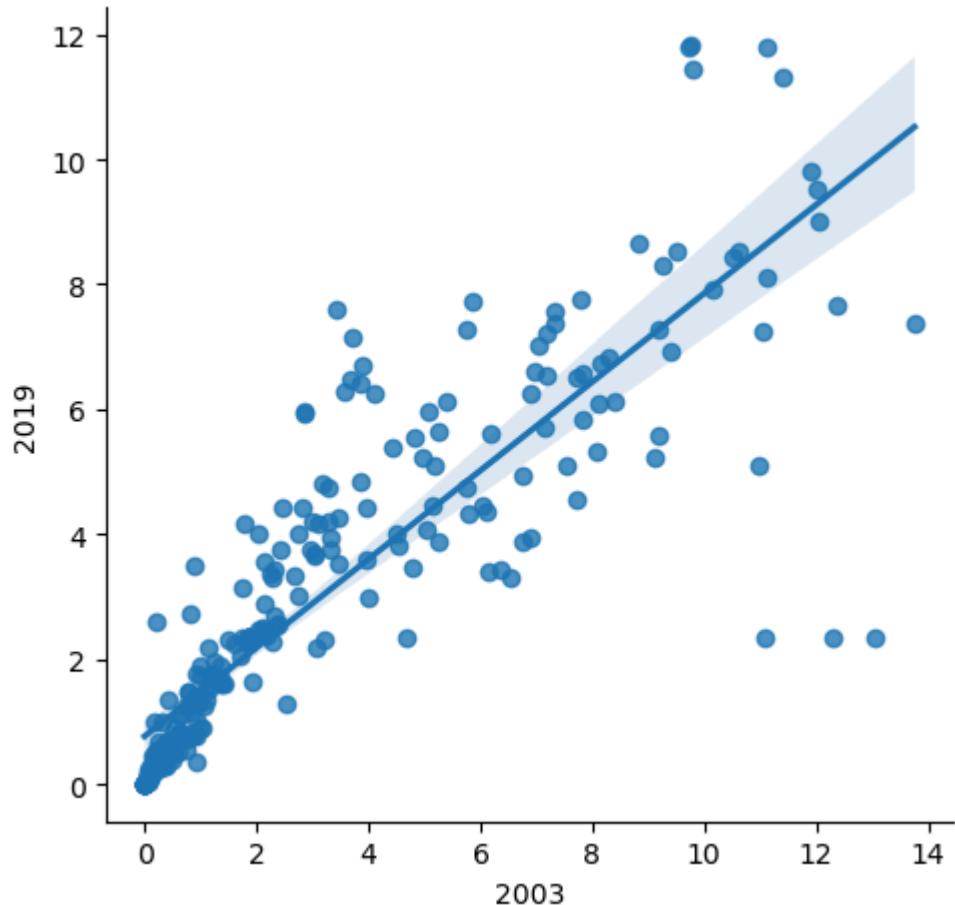
Scaterplot of 2003 vs 2018



Corelation between 2003 and 2018 : 0.8567645378778426

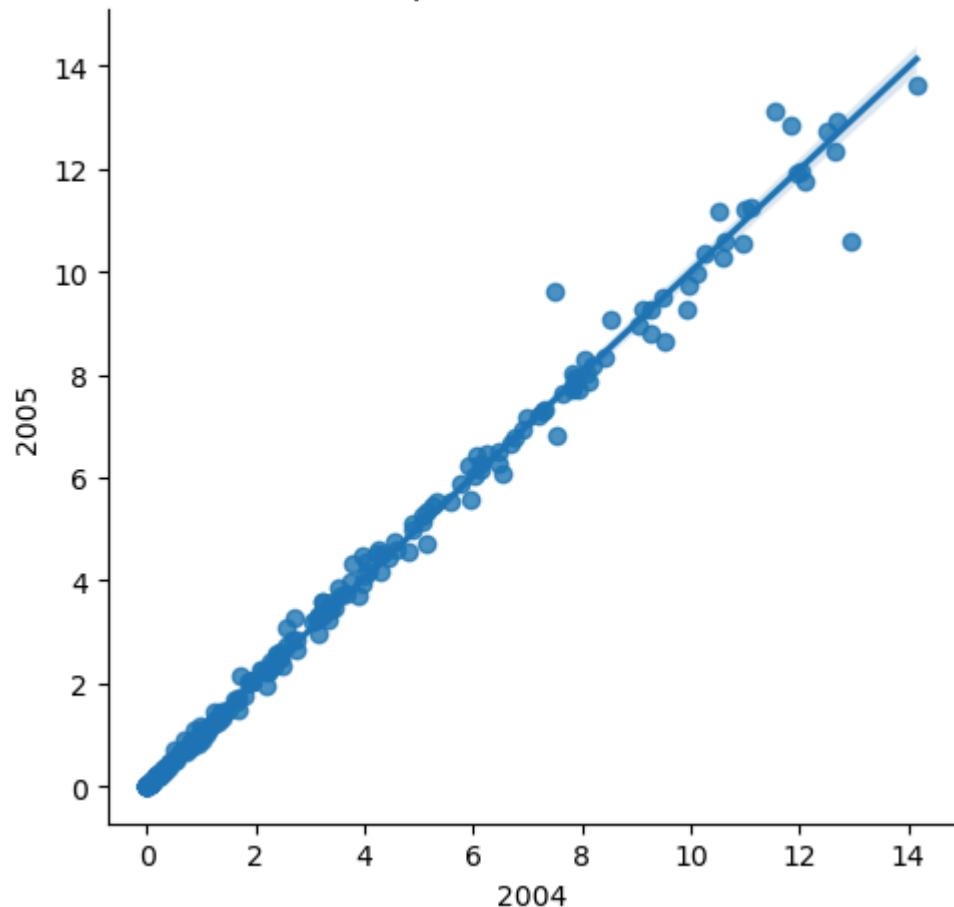
Corelation: Positively Corelated.

Scaterplot of 2003 vs 2019



Corelation between 2003 and 2019 : 0.866998167886166

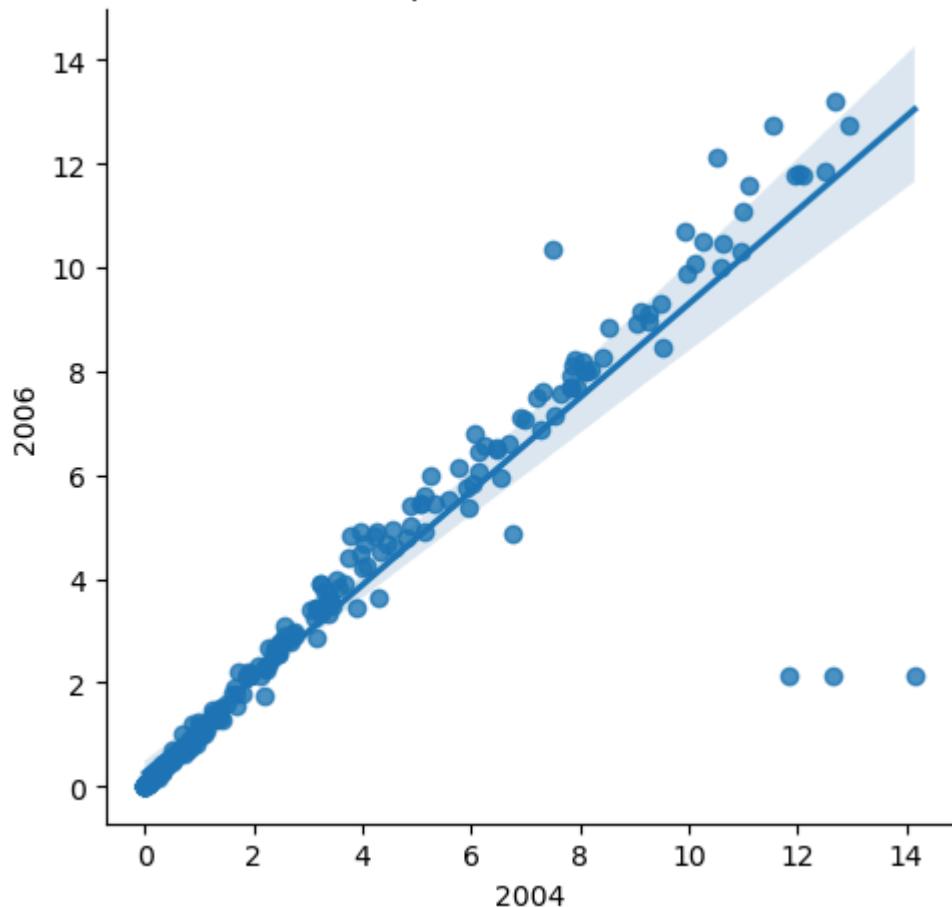
Corelation: Positively Corelated.

Scaterplot of 2004 vs 2005

Corelation between 2004 and 2005 : 0.996600139405841

Corelation: Positively Corelated.

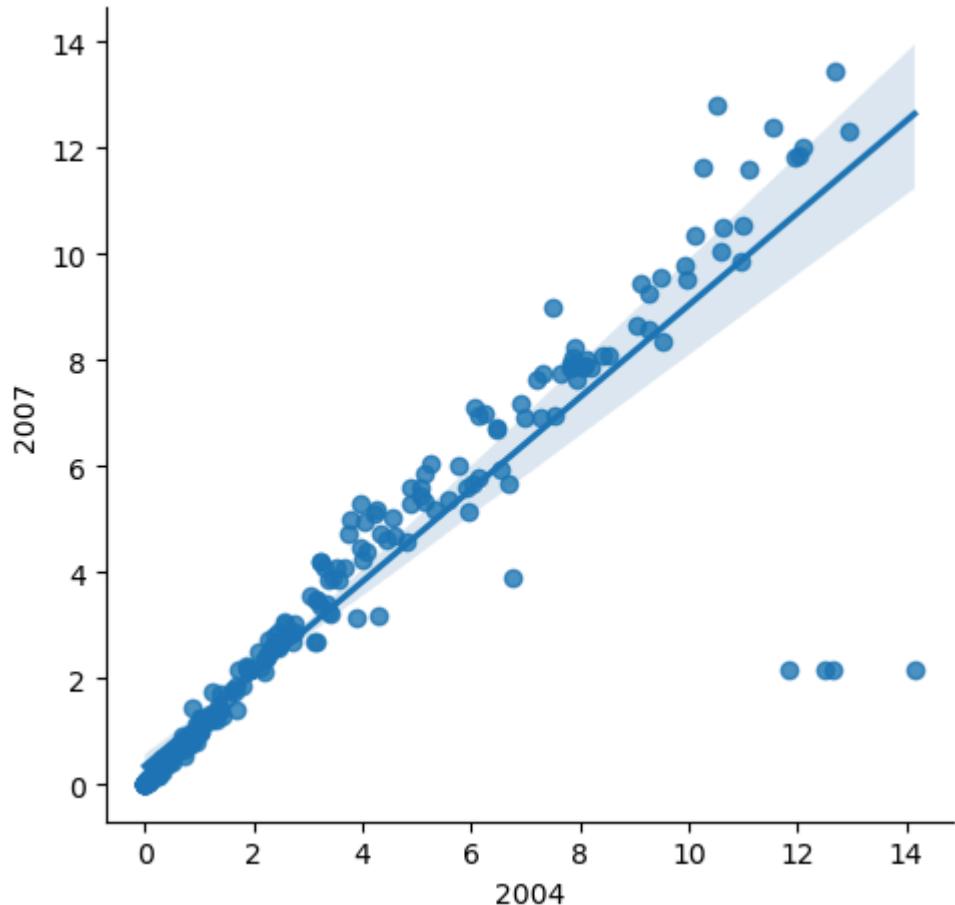
Scaterplot of 2004 vs 2006



Corelation between 2004 and 2006 : 0.9389868064873211

Corelation: Positively Corelated.

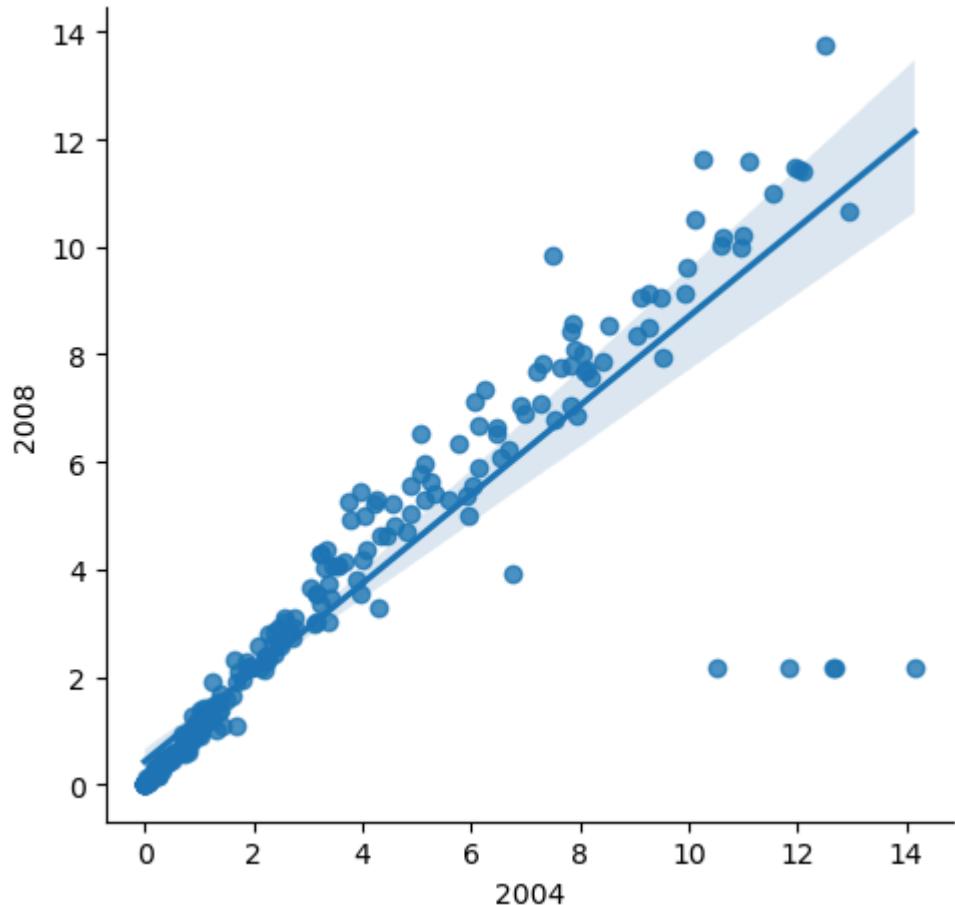
Scaterplot of 2004 vs 2007



Corelation between 2004 and 2007 : 0.91916826999899

Corelation: Positively Corelated.

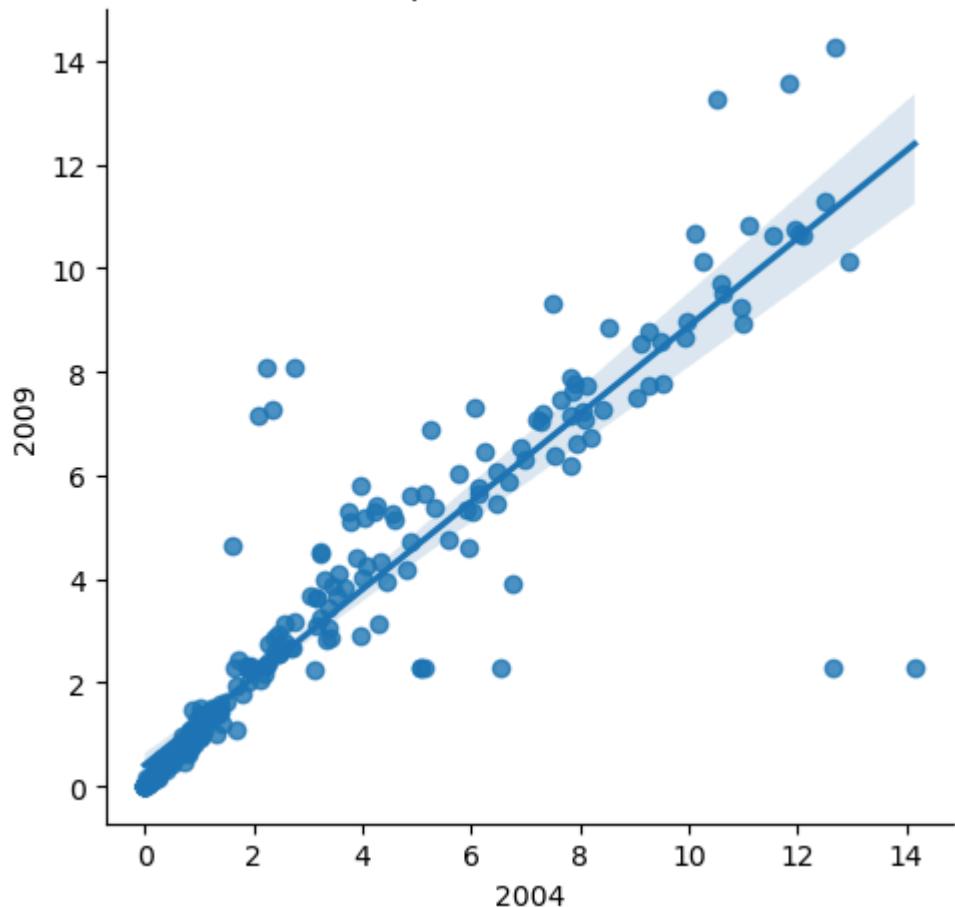
Scaterplot of 2004 vs 2008



Corelation between 2004 and 2008 : 0.9041191130100623

Corelation: Positively Corelated.

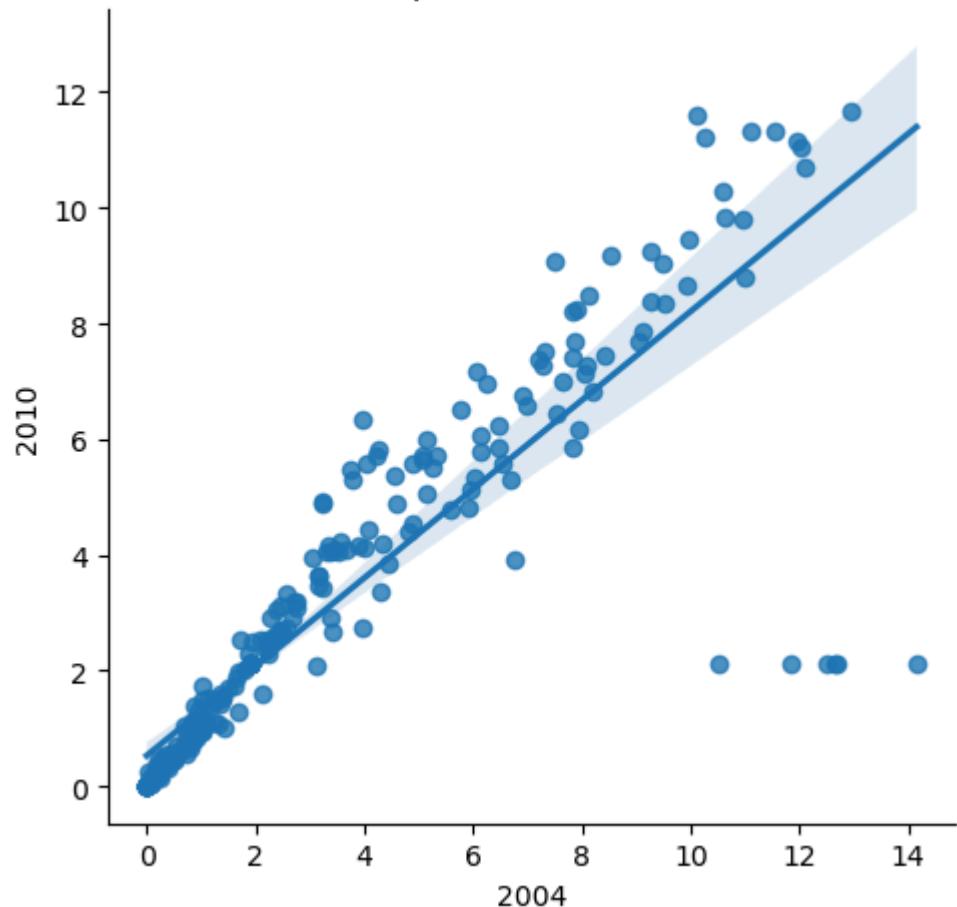
Scaterplot of 2004 vs 2009



Corelation between 2004 and 2009 : 0.9152251017644732

Corelation: Positively Corelated.

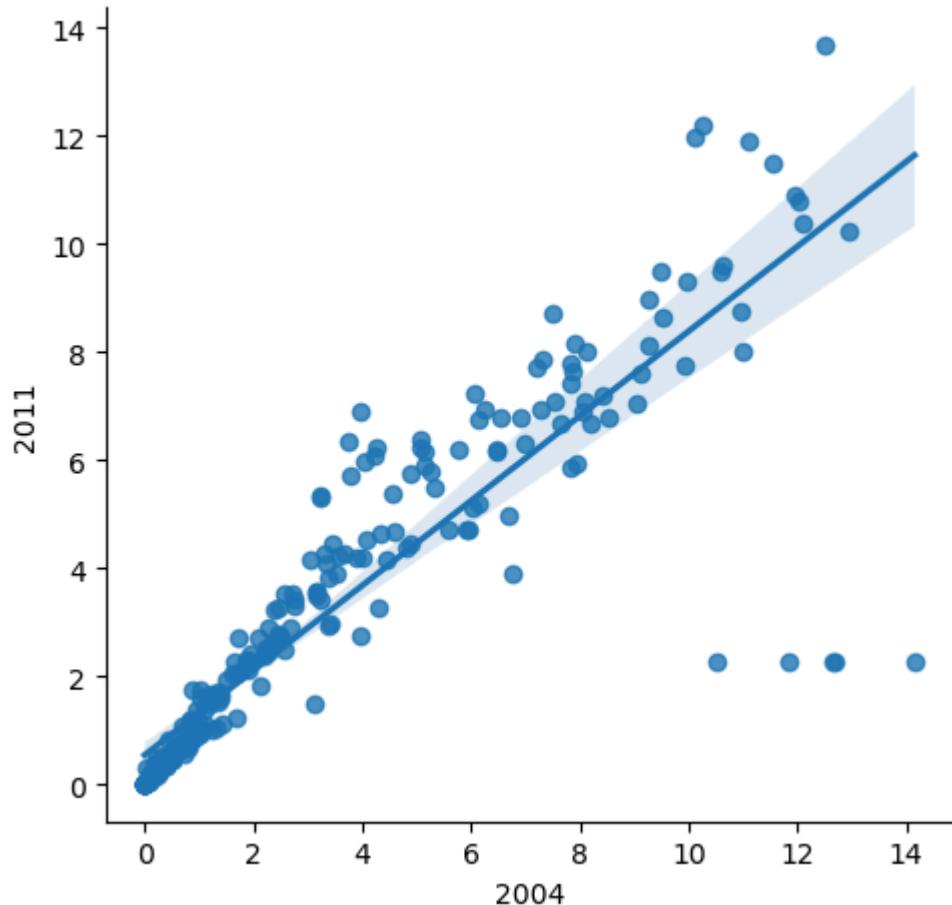
Scaterplot of 2004 vs 2010



Corelation between 2004 and 2010 : 0.8793793059597119

Corelation: Positively Corelated.

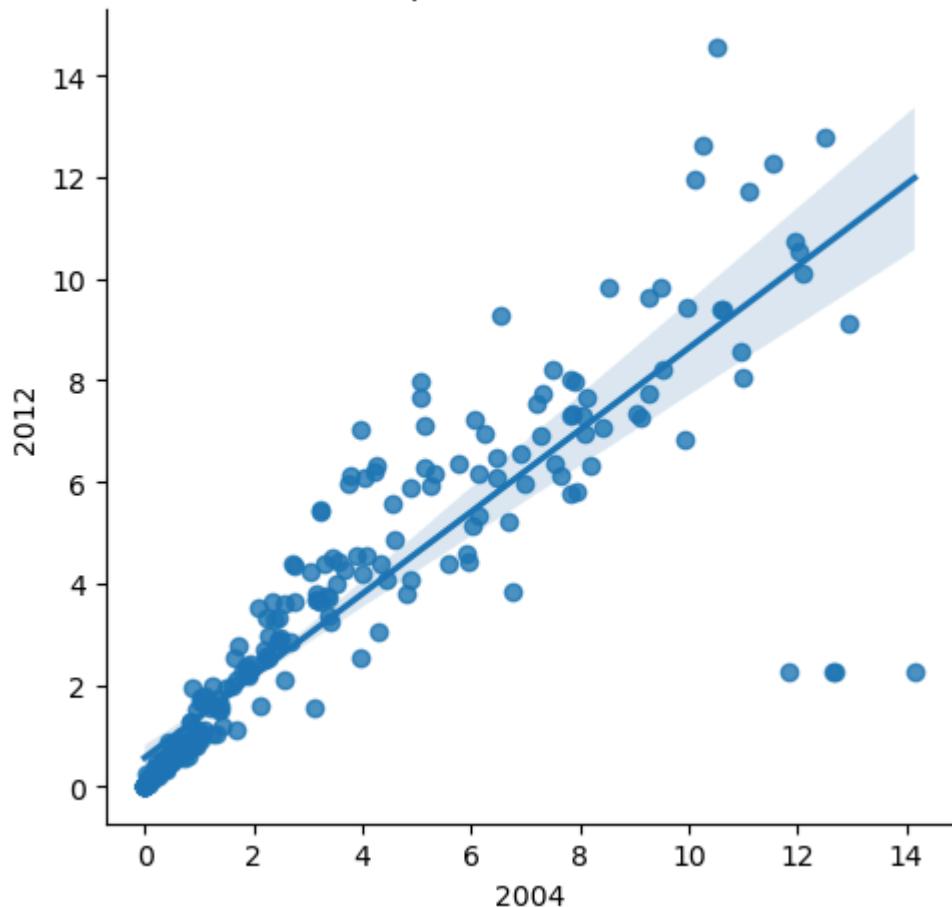
Scaterplot of 2004 vs 2011



Corelation between 2004 and 2011 : 0.8890420276593614

Corelation: Positively Corelated.

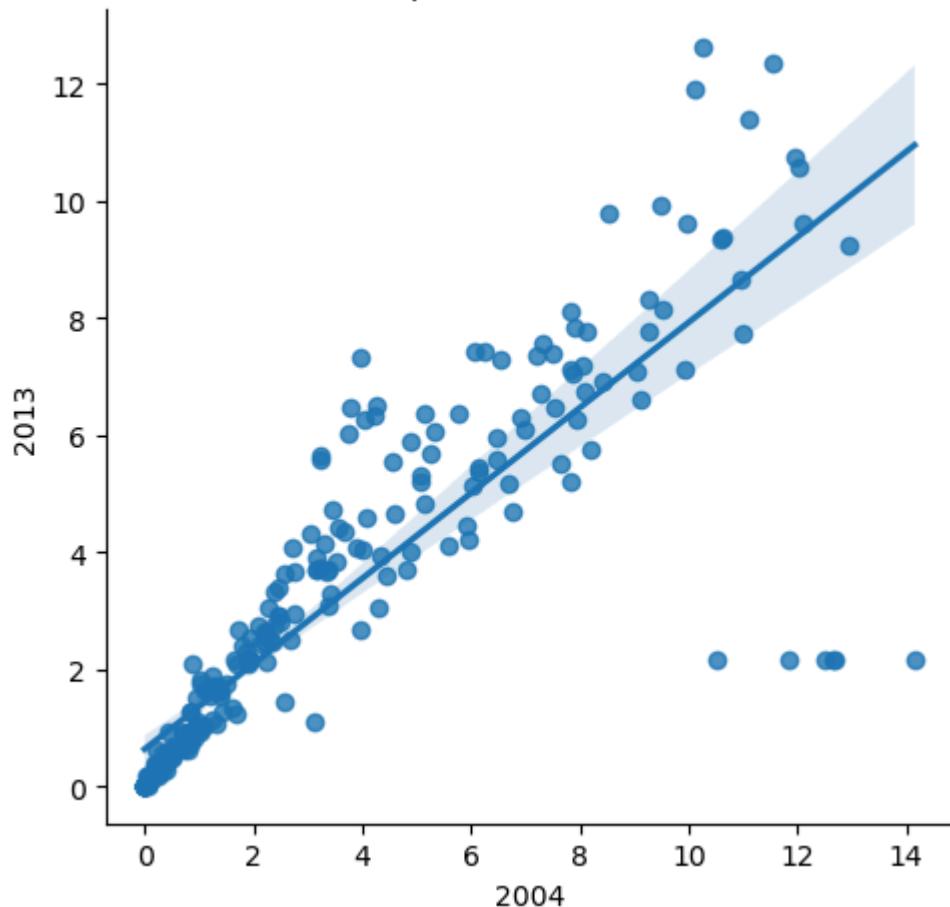
Scaterplot of 2004 vs 2012



Corelation between 2004 and 2012 : 0.8863163642061165

Corelation: Positively Corelated.

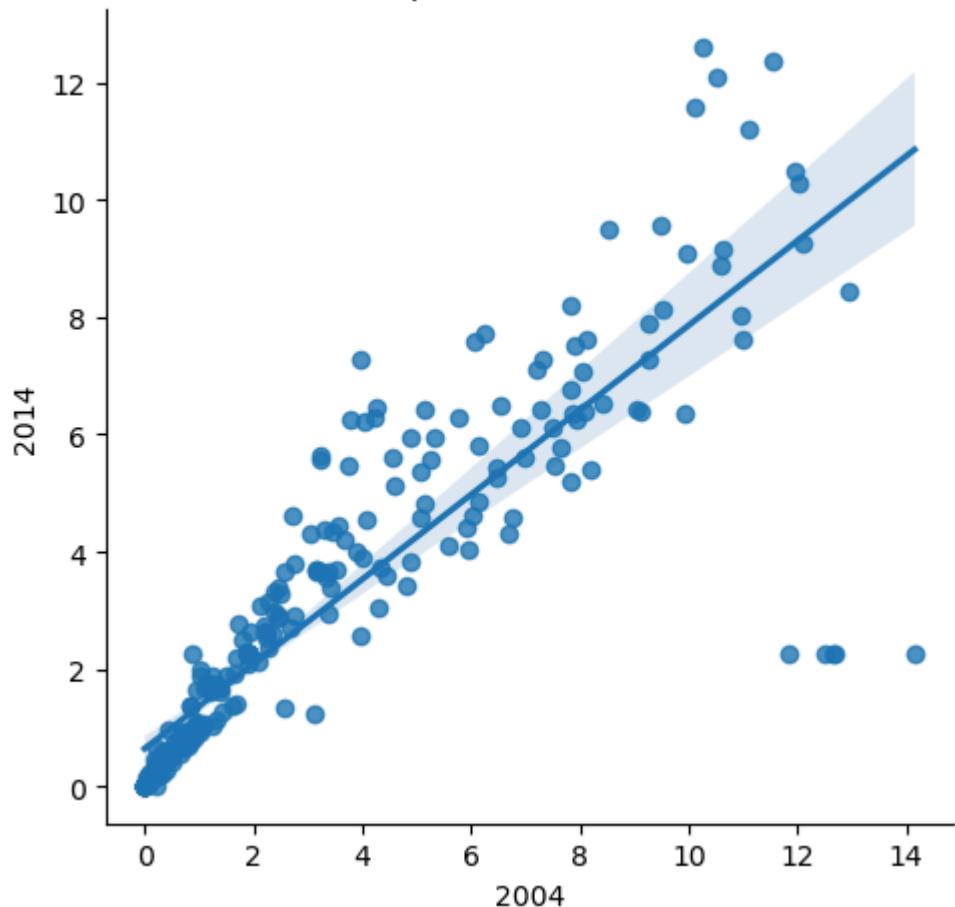
Scaterplot of 2004 vs 2013



Corelation between 2004 and 2013 : 0.8603623493534289

Corelation: Positively Corelated.

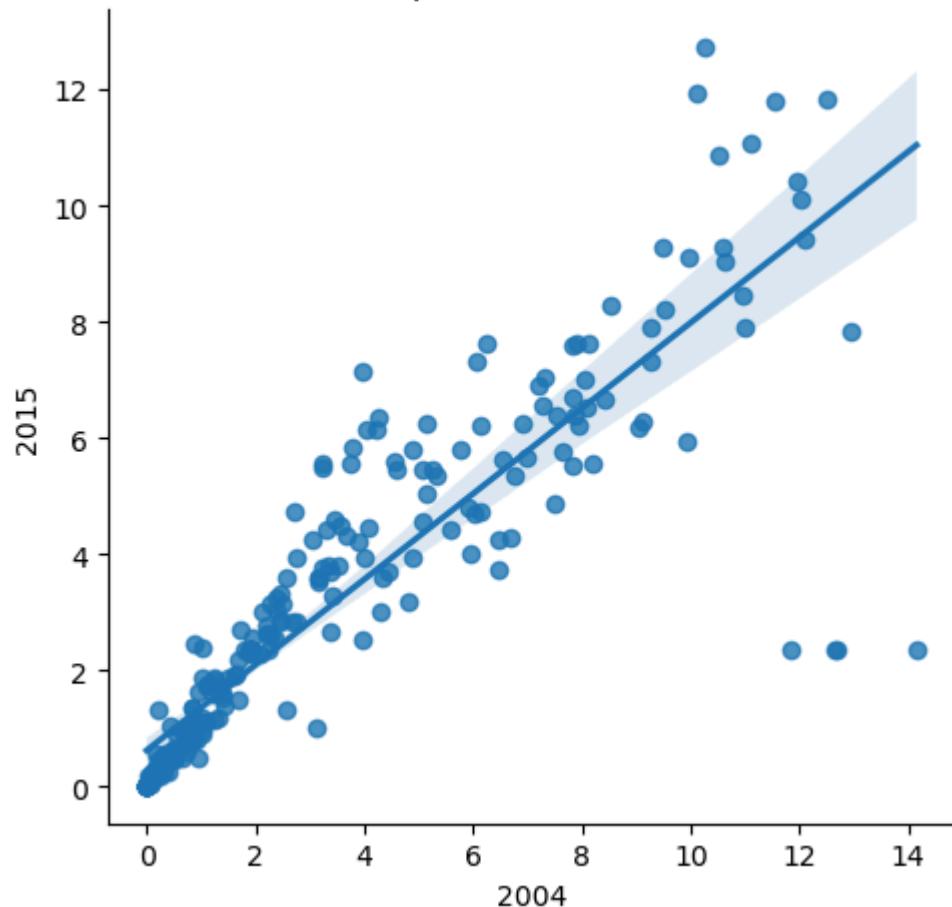
Scaterplot of 2004 vs 2014



Corelation between 2004 and 2014 : 0.8660681117714027

Corelation: Positively Corelated.

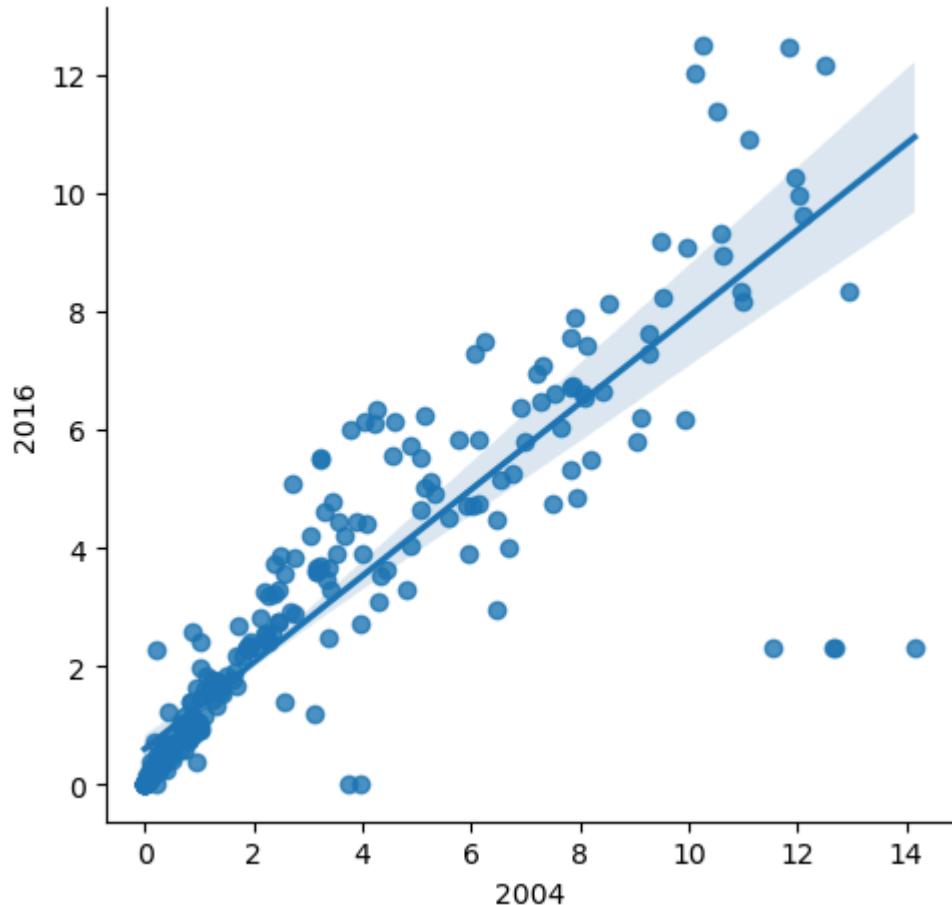
Scaterplot of 2004 vs 2015



Corelation between 2004 and 2015 : 0.884465916232392

Corelation: Positively Corelated.

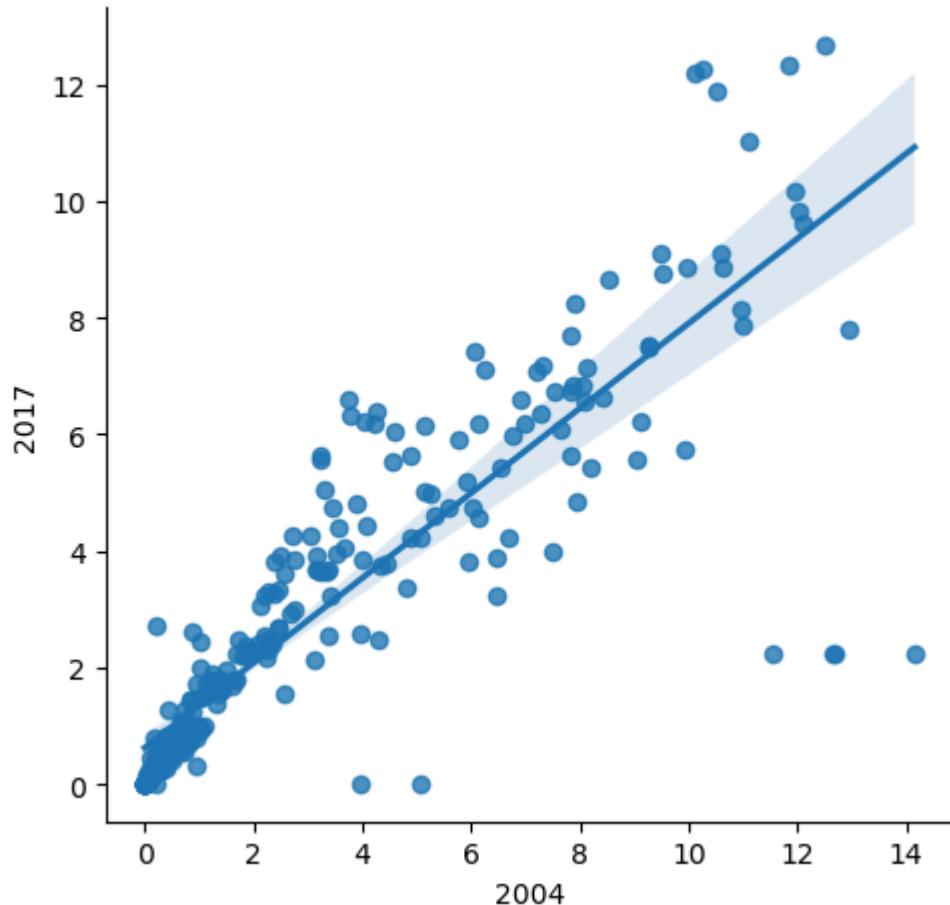
Scaterplot of 2004 vs 2016



Corelation between 2004 and 2016 : 0.8793794584522987

Corelation: Positively Corelated.

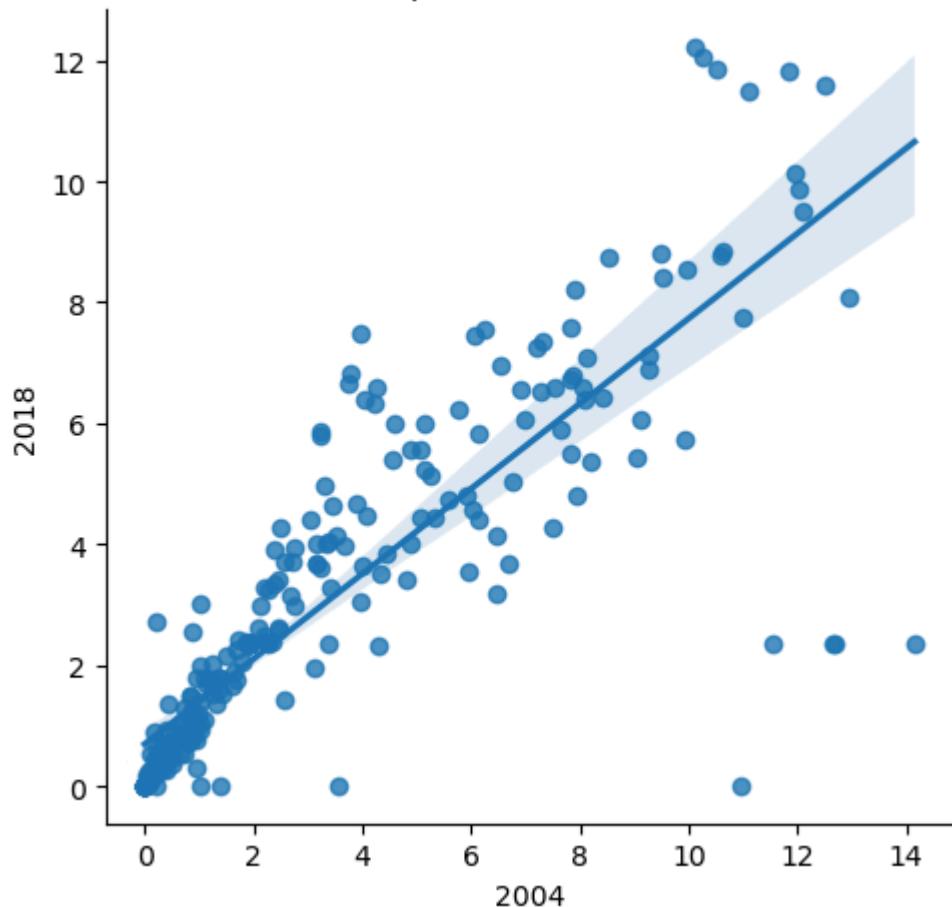
Scaterplot of 2004 vs 2017



Corelation between 2004 and 2017 : 0.8705309099607624

Corelation: Positively Corelated.

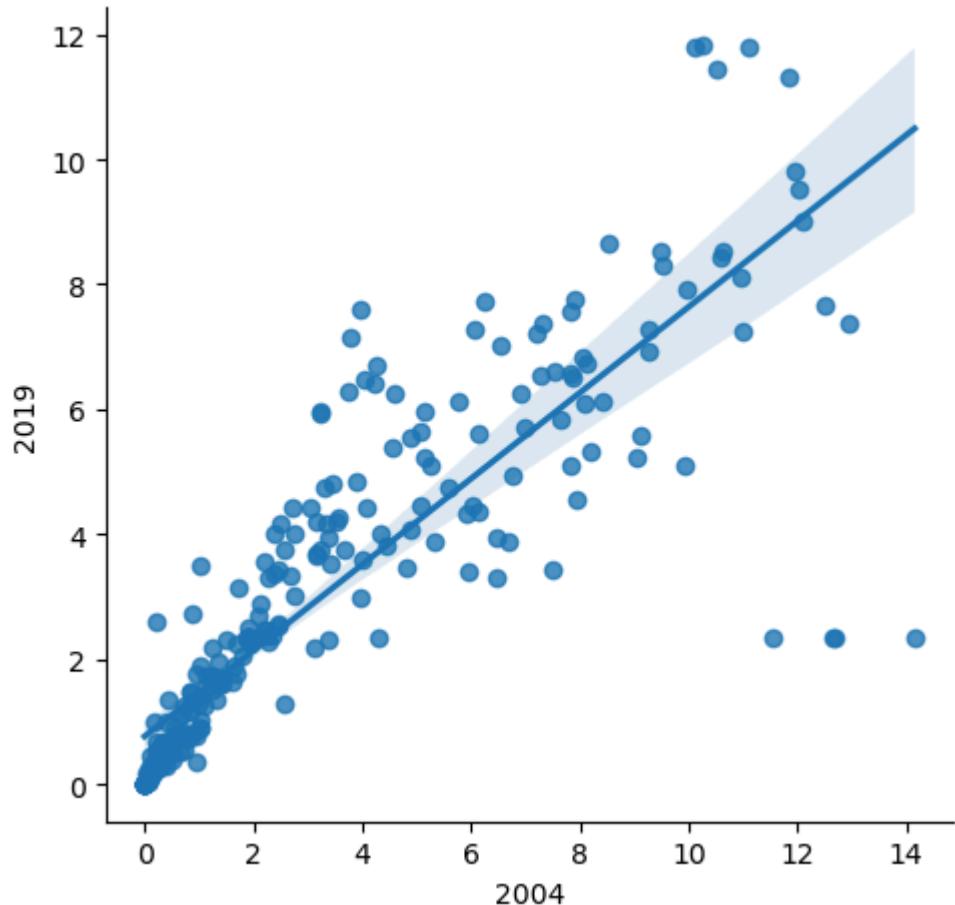
Scaterplot of 2004 vs 2018



Corelation between 2004 and 2018 : 0.8487868064516059

Corelation: Positively Corelated.

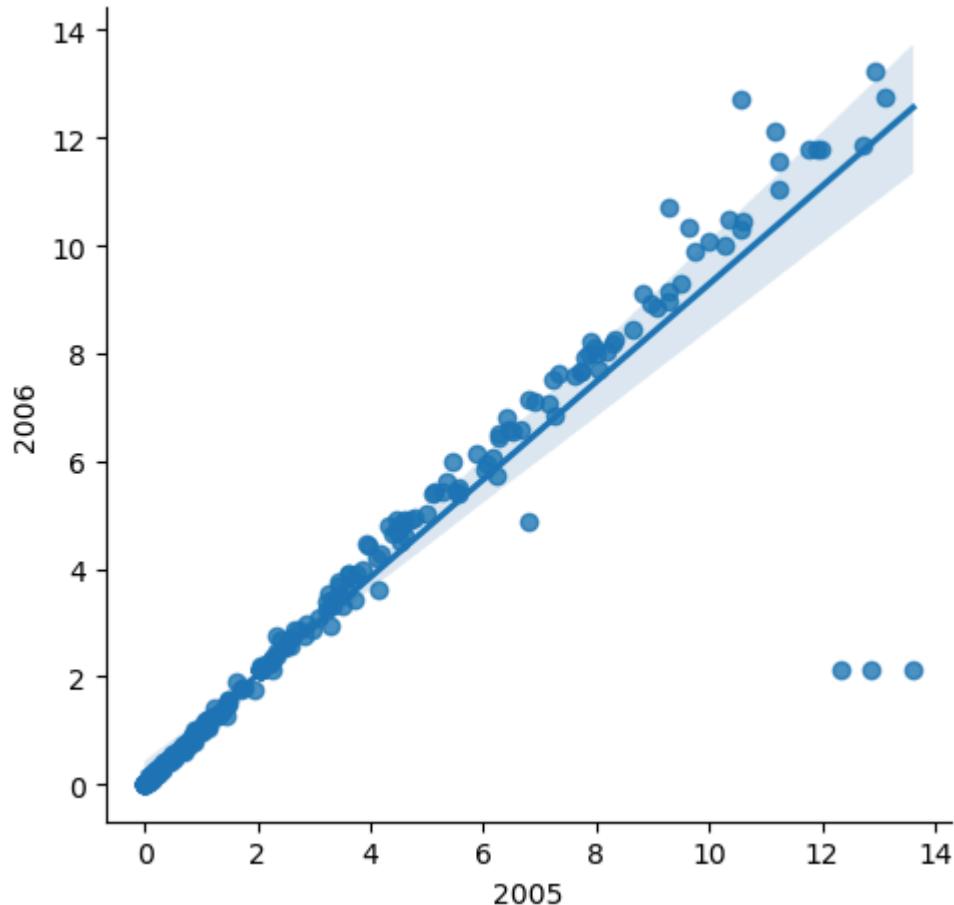
Scaterplot of 2004 vs 2019



Corelation between 2004 and 2019 : 0.8582722000273888

Corelation: Positively Corelated.

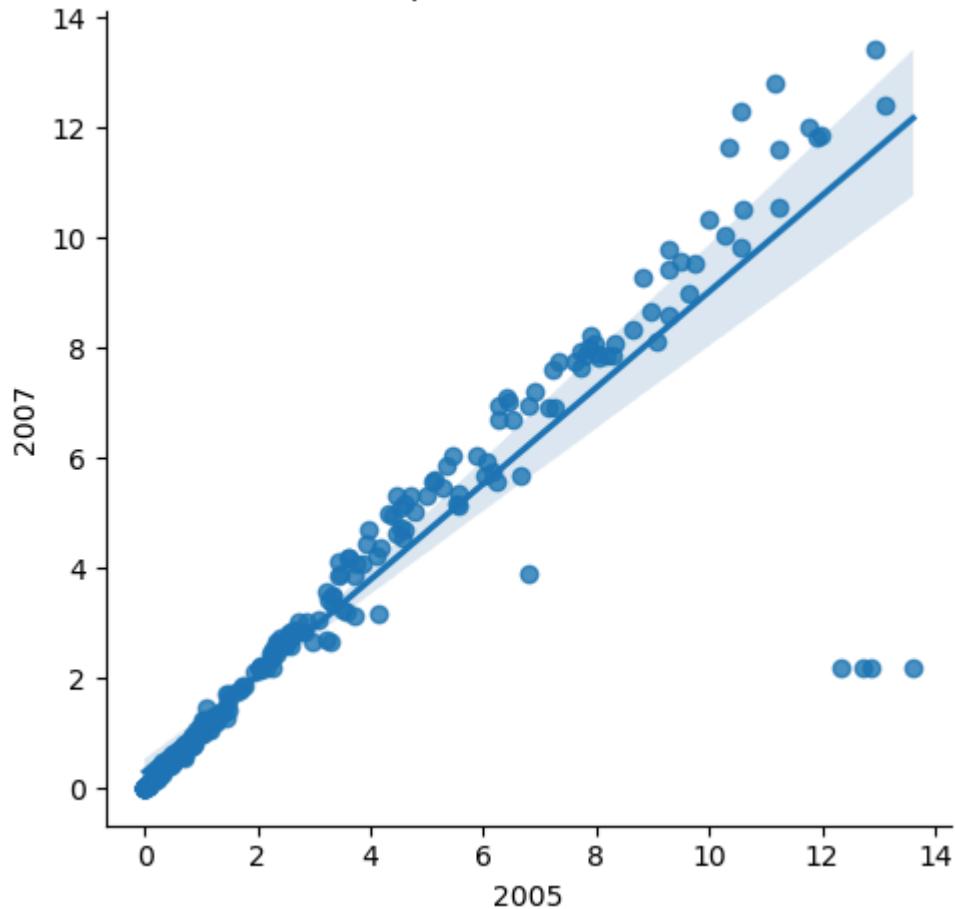
Scaterplot of 2005 vs 2006



Corelation between 2005 and 2006 : 0.9411389973294789

Corelation: Positively Corelated.

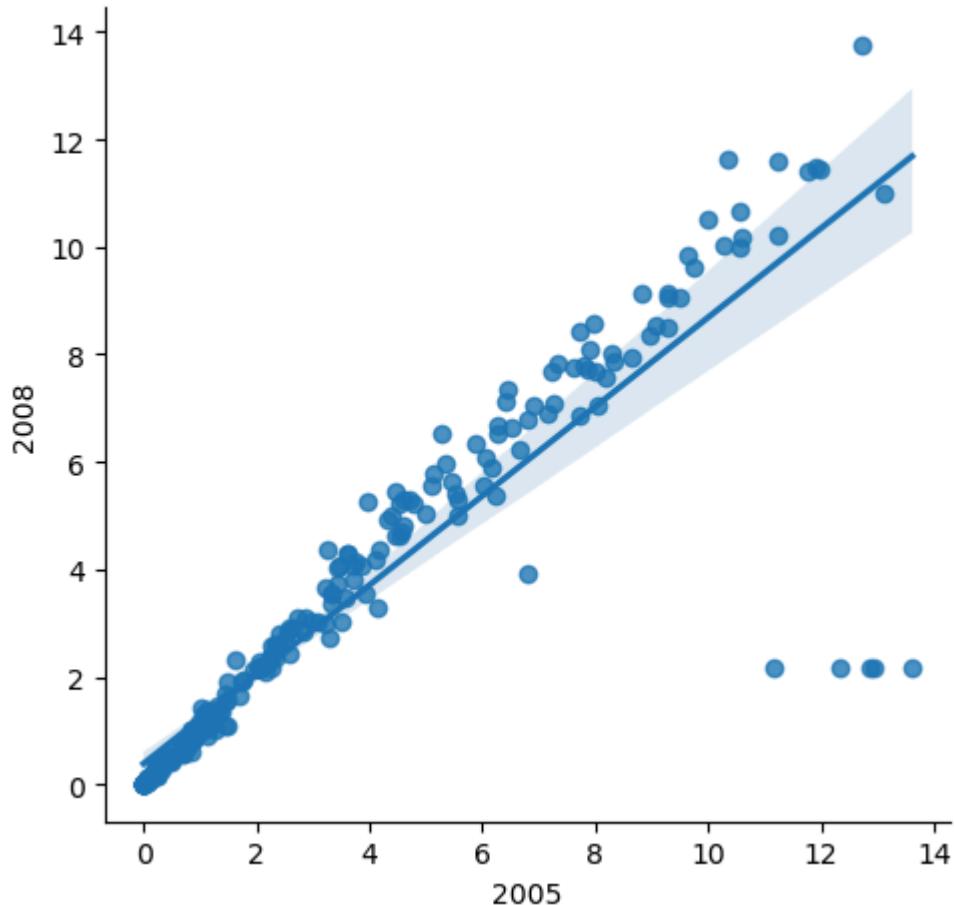
Scaterplot of 2005 vs 2007



Corelation between 2005 and 2007 : 0.9206766855859435

Corelation: Positively Corelated.

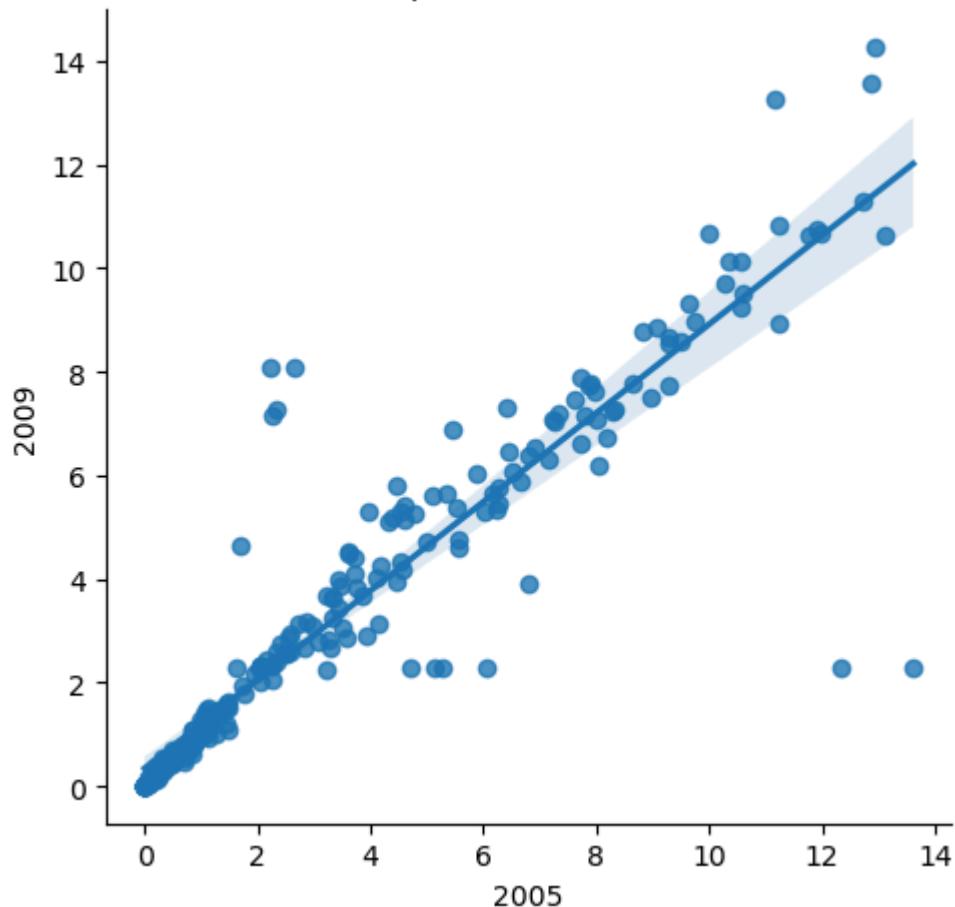
Scaterplot of 2005 vs 2008



Corelation between 2005 and 2008 : 0.9051859010115758

Corelation: Positively Corelated.

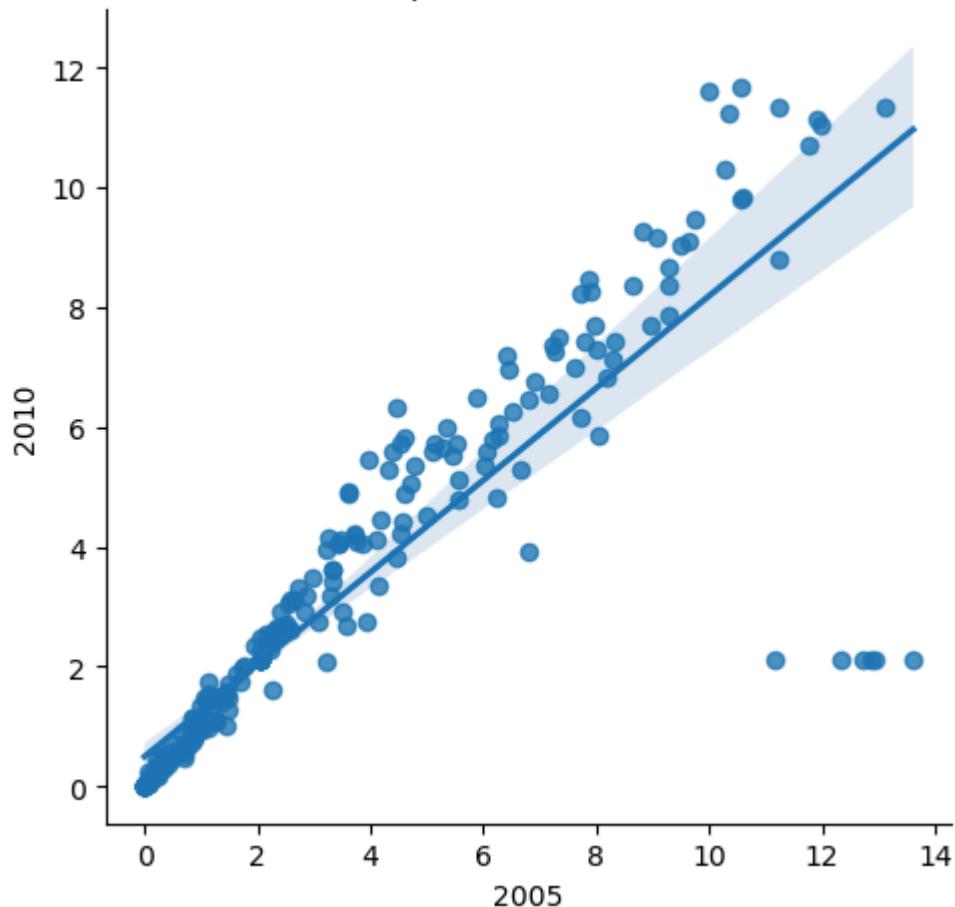
Scaterplot of 2005 vs 2009



Corelation between 2005 and 2009 : 0.924559171144365

Corelation: Positively Corelated.

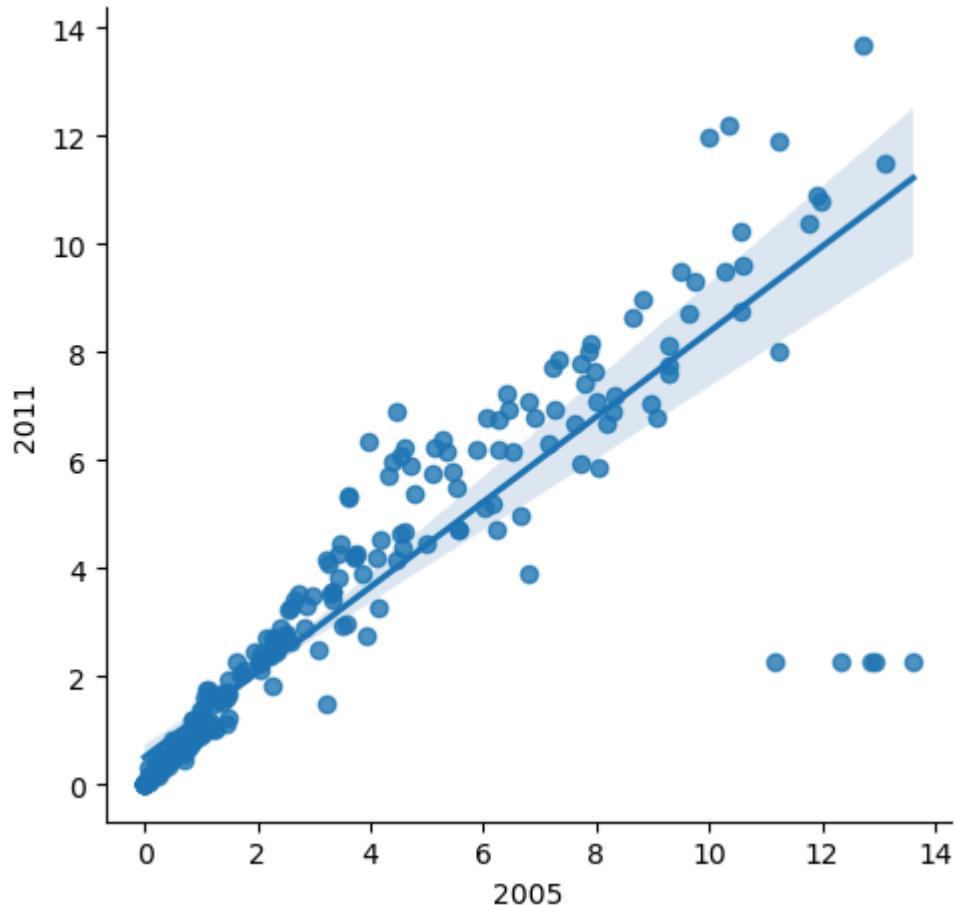
Scaterplot of 2005 vs 2010



Corelation between 2005 and 2010 : 0.8789504212380608

Corelation: Positively Corelated.

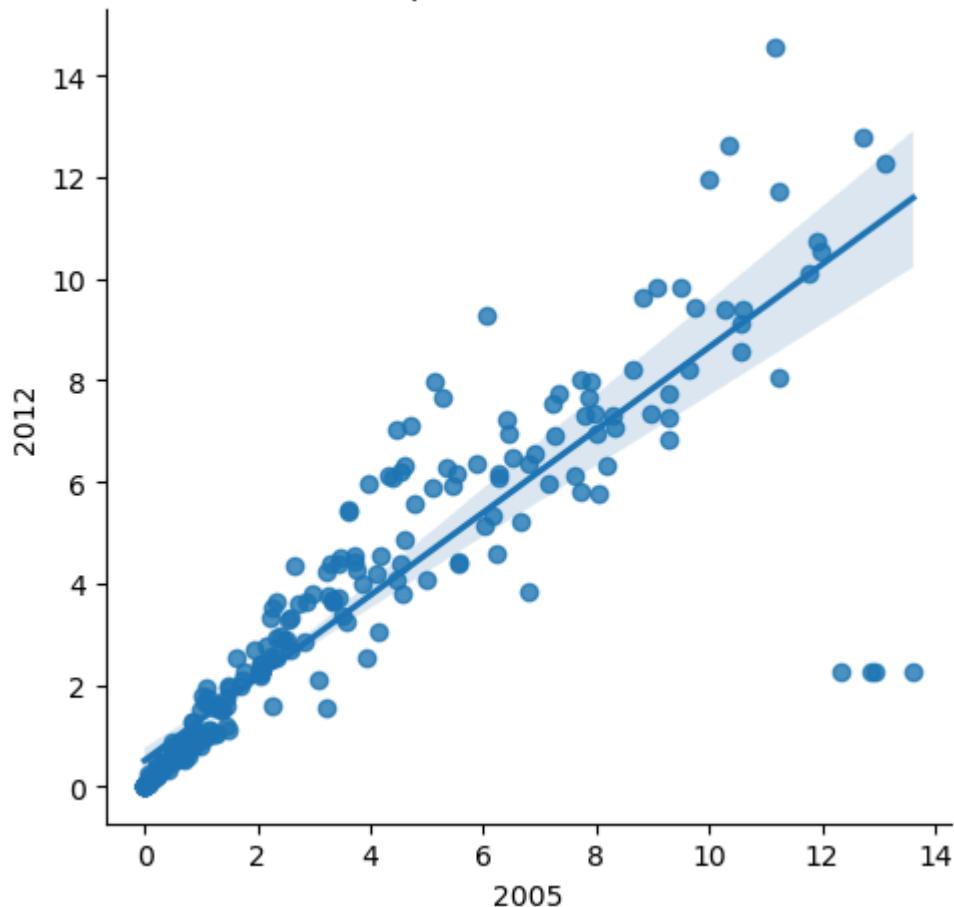
Scaterplot of 2005 vs 2011



Corelation between 2005 and 2011 : 0.8908559172353829

Corelation: Positively Corelated.

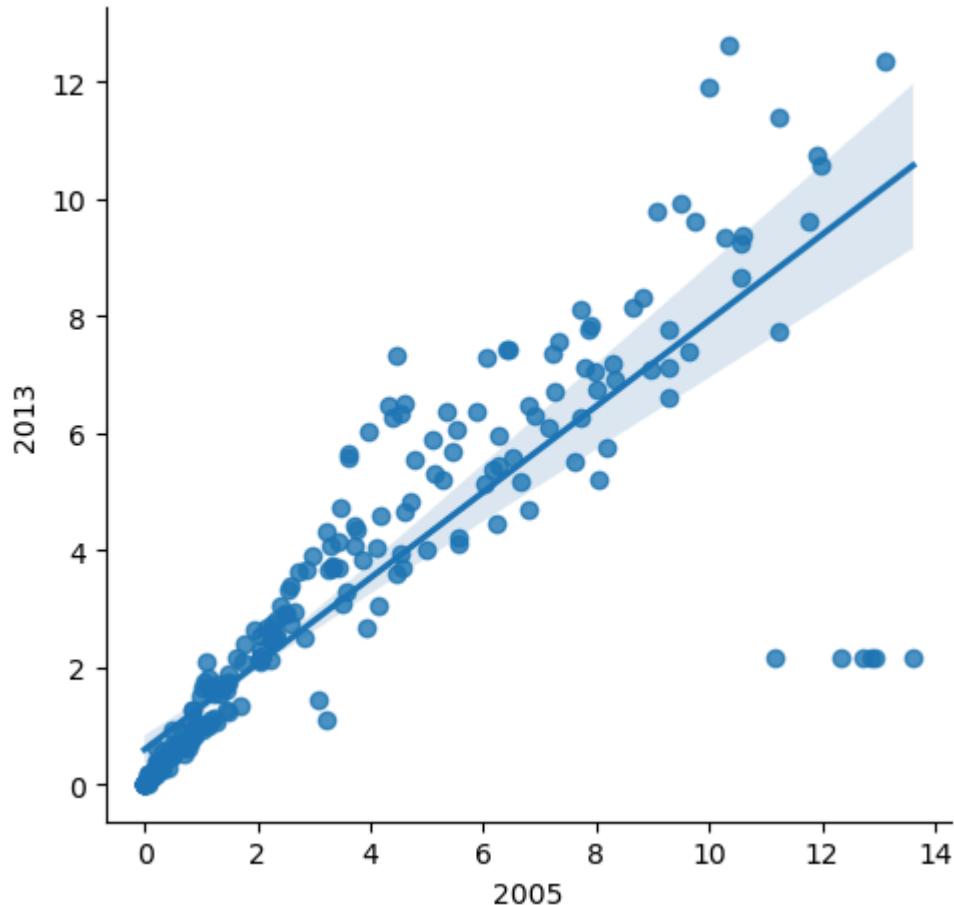
Scaterplot of 2005 vs 2012



Corelation between 2005 and 2012 : 0.8924461989120489

Corelation: Positively Corelated.

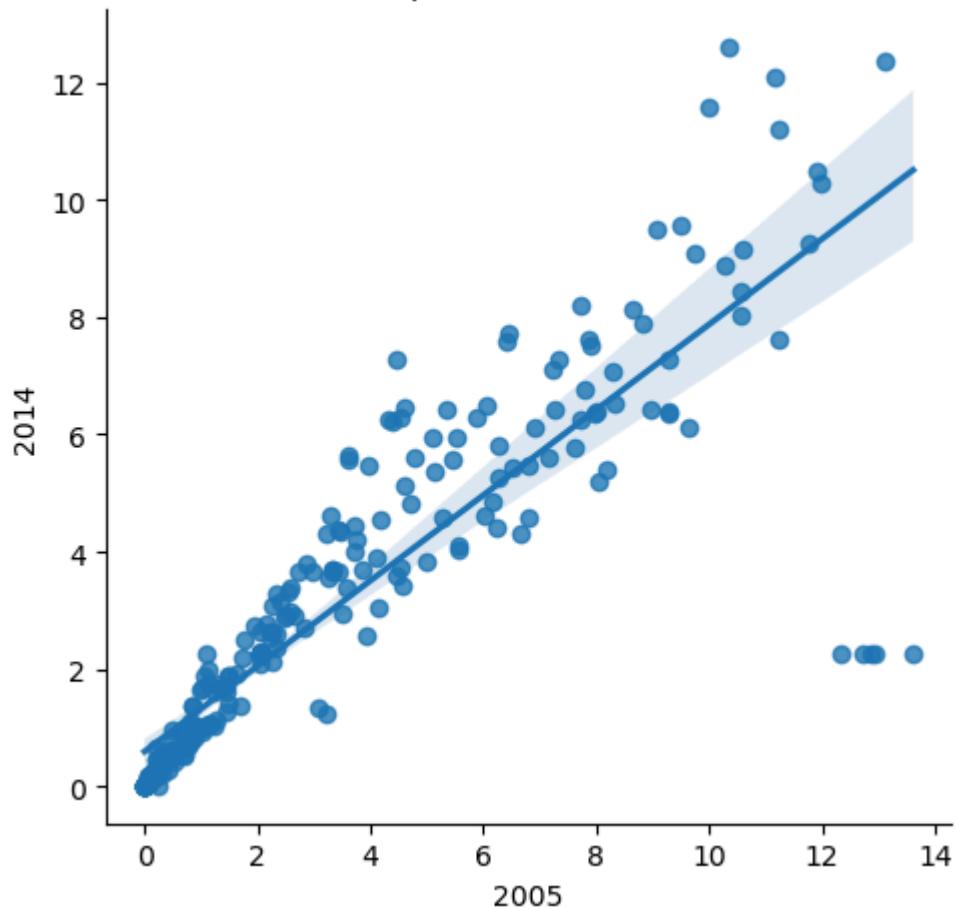
Scaterplot of 2005 vs 2013



Corelation between 2005 and 2013 : 0.8634180493494528

Corelation: Positively Corelated.

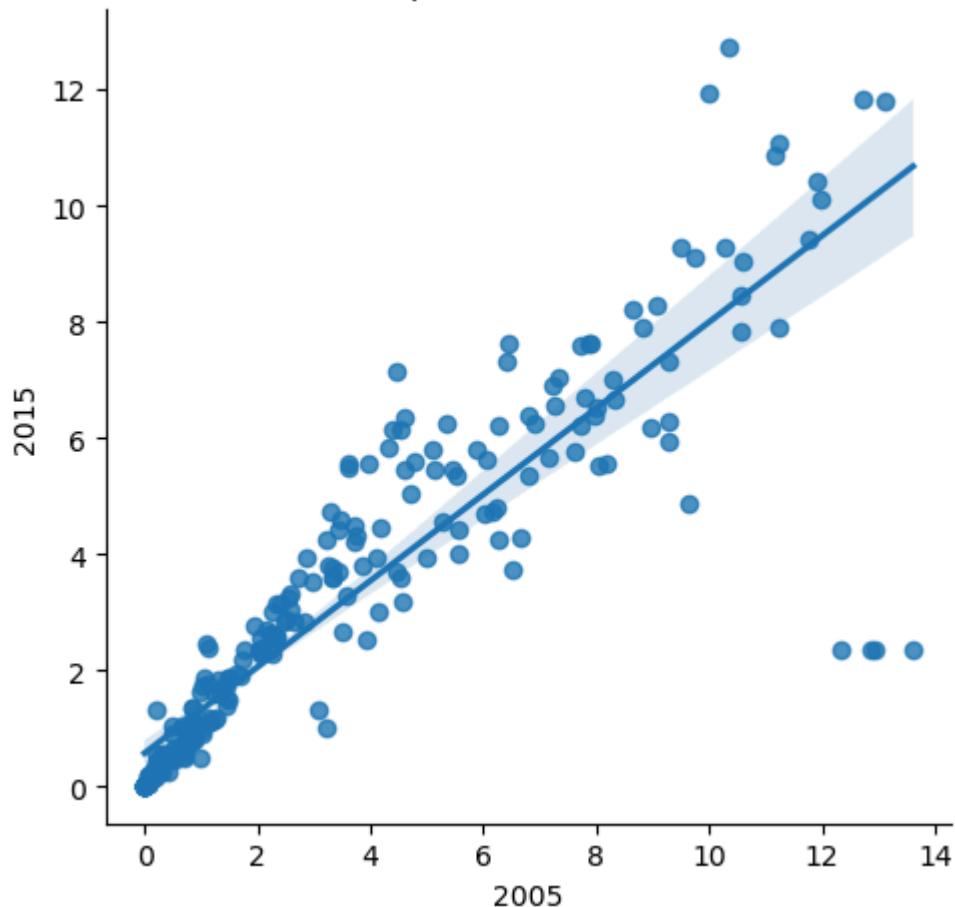
Scaterplot of 2005 vs 2014



Corelation between 2005 and 2014 : 0.8723178313740653

Corelation: Positively Corelated.

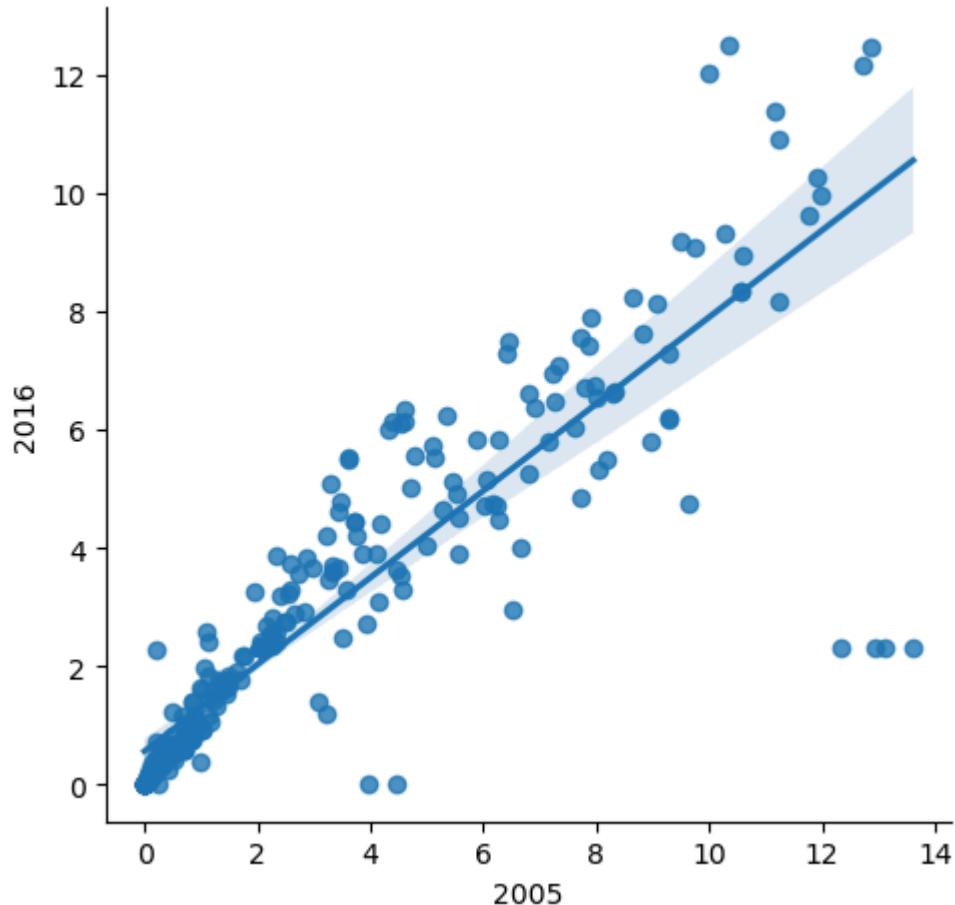
Scaterplot of 2005 vs 2015



Corelation between 2005 and 2015 : 0.8899874202705641

Corelation: Positively Corelated.

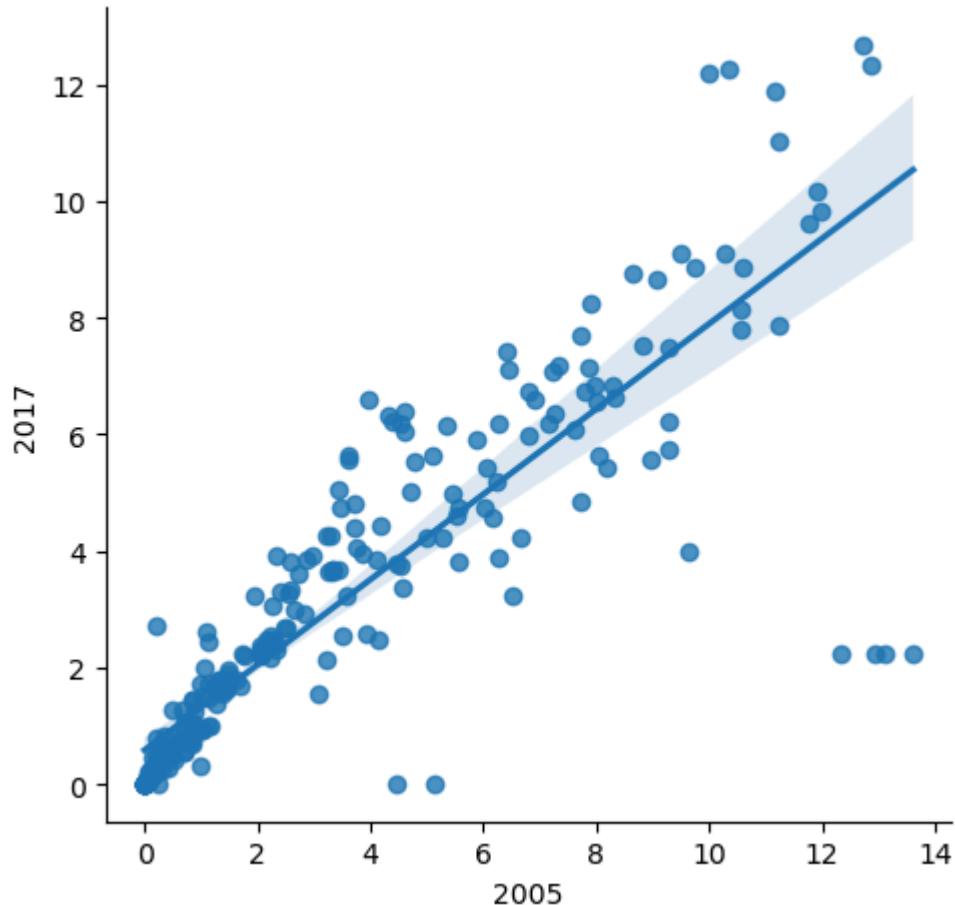
Scaterplot of 2005 vs 2016



Corelation between 2005 and 2016 : 0.8811826238135753

Corelation: Positively Corelated.

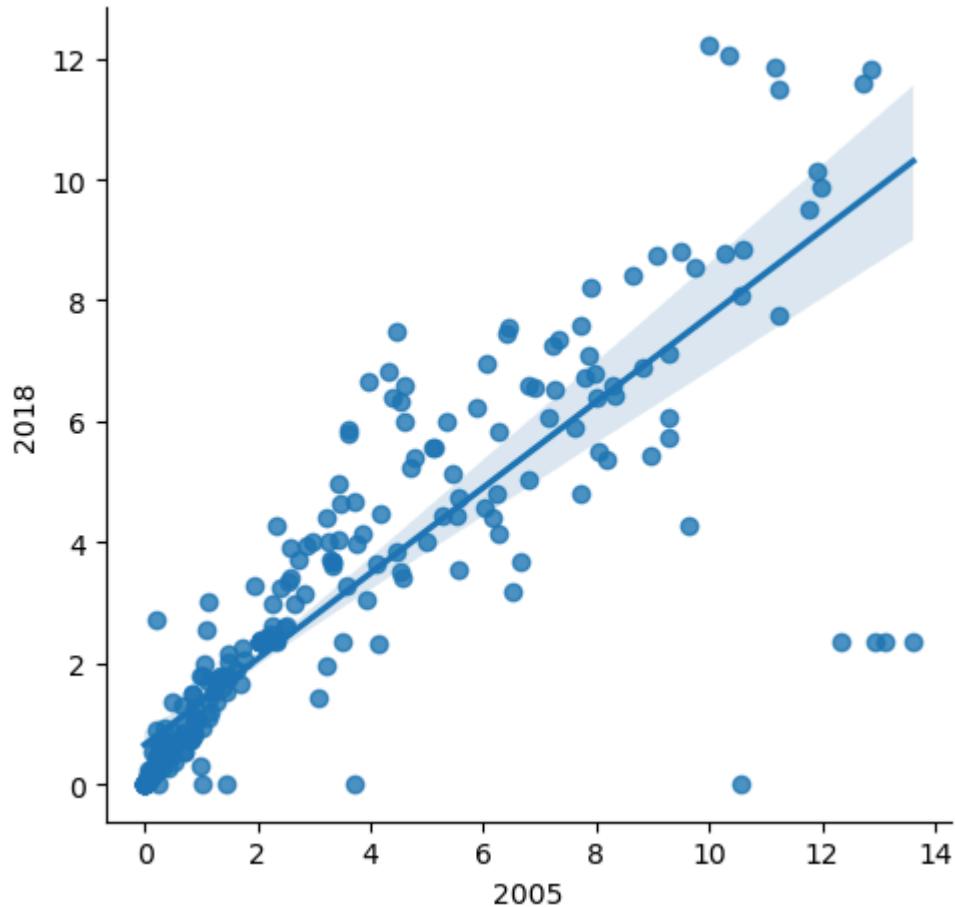
Scaterplot of 2005 vs 2017



Corelation between 2005 and 2017 : 0.8727288086170291

Corelation: Positively Corelated.

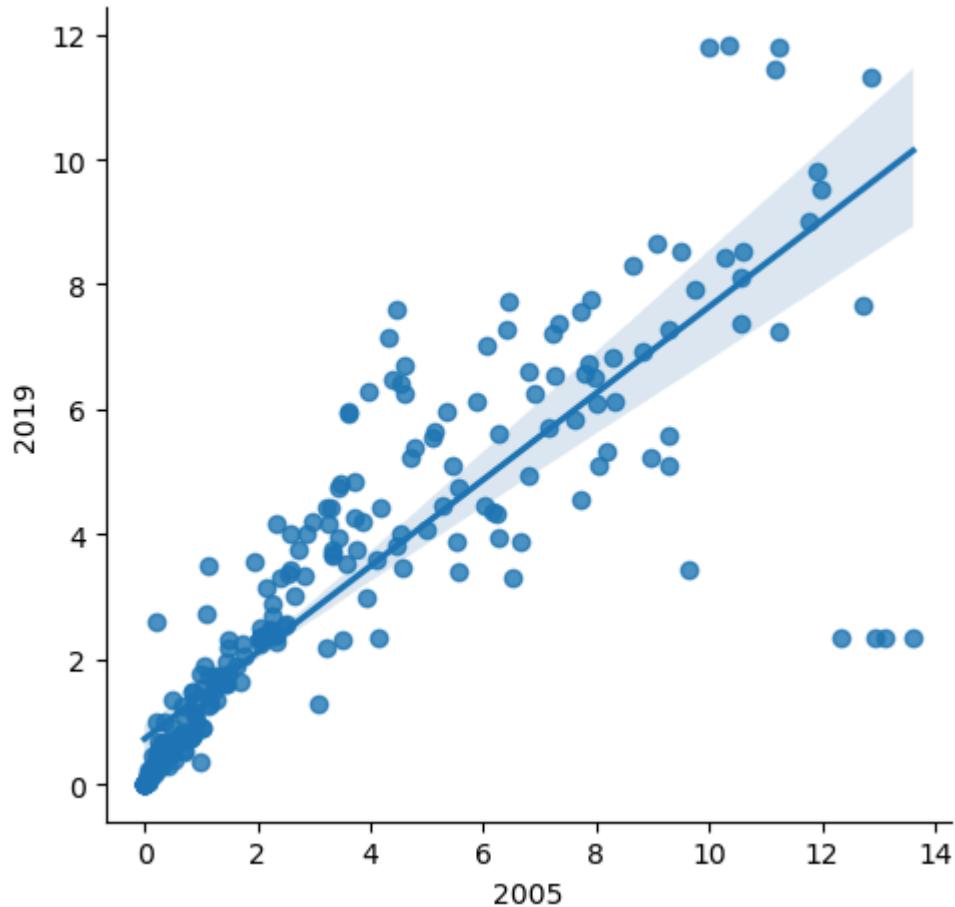
Scaterplot of 2005 vs 2018



Corelation between 2005 and 2018 : 0.8533856881041622

Corelation: Positively Corelated.

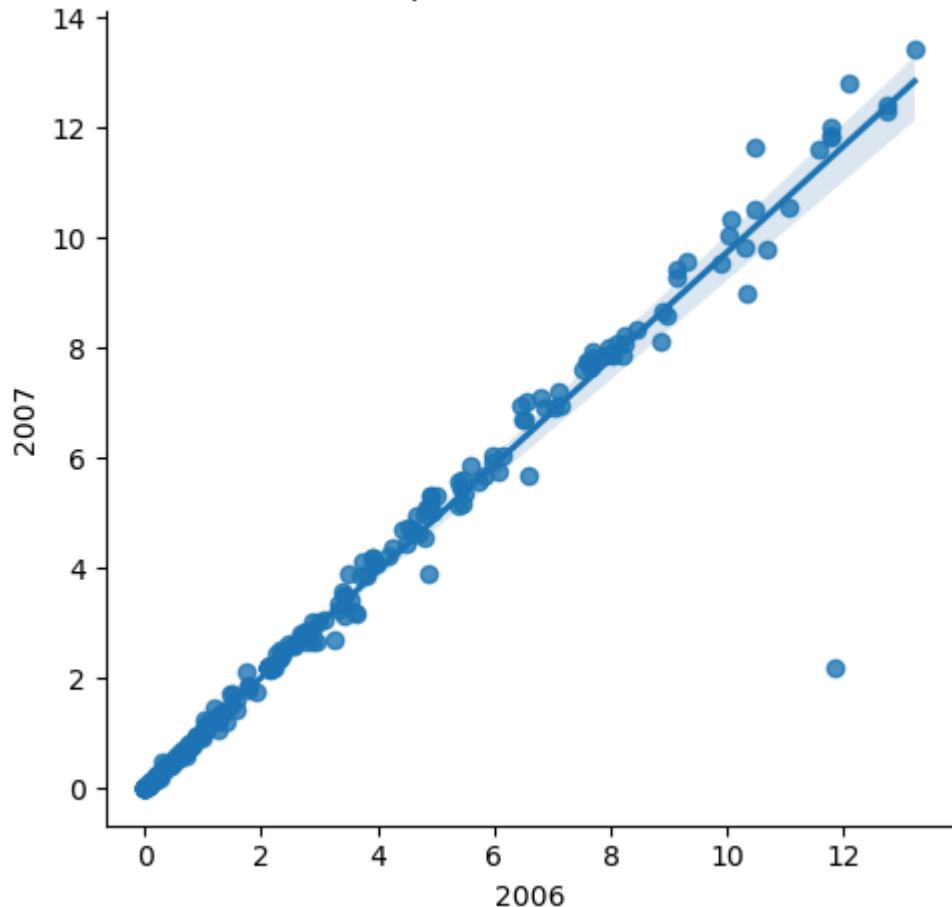
Scaterplot of 2005 vs 2019



Corelation between 2005 and 2019 : 0.8619834676717788

Corelation: Positively Corelated.

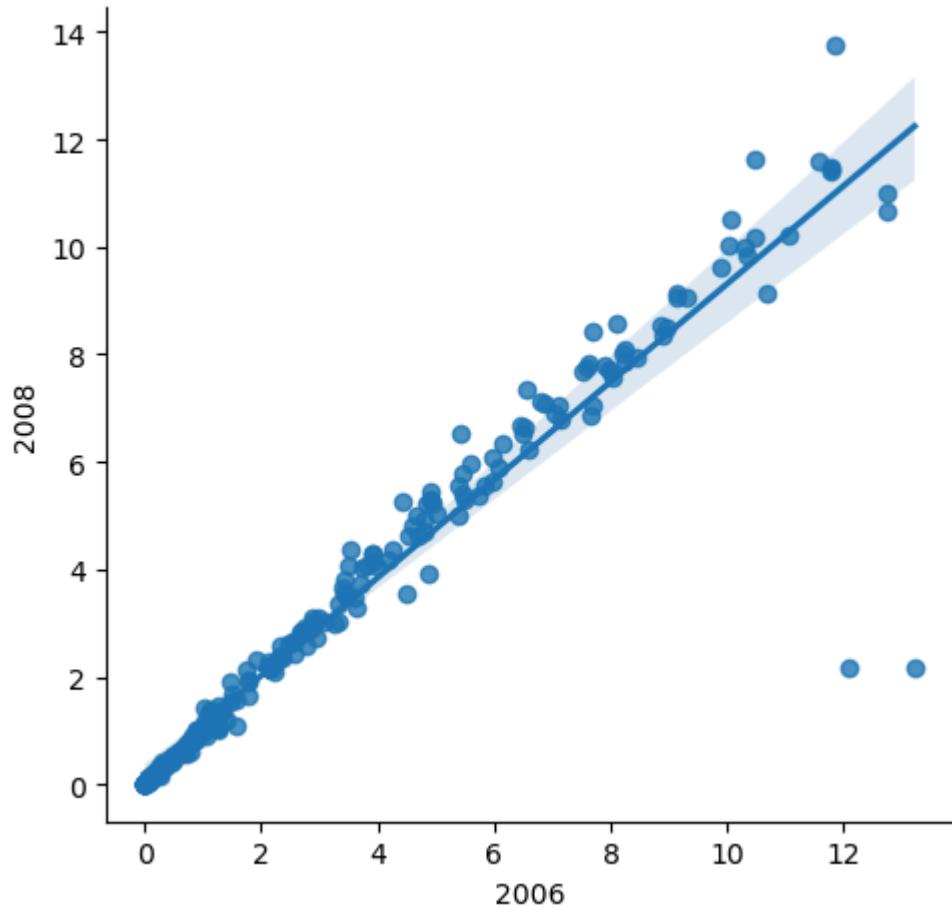
Scaterplot of 2006 vs 2007



Corelation between 2006 and 2007 : 0.9819530854695505

Corelation: Positively Corelated.

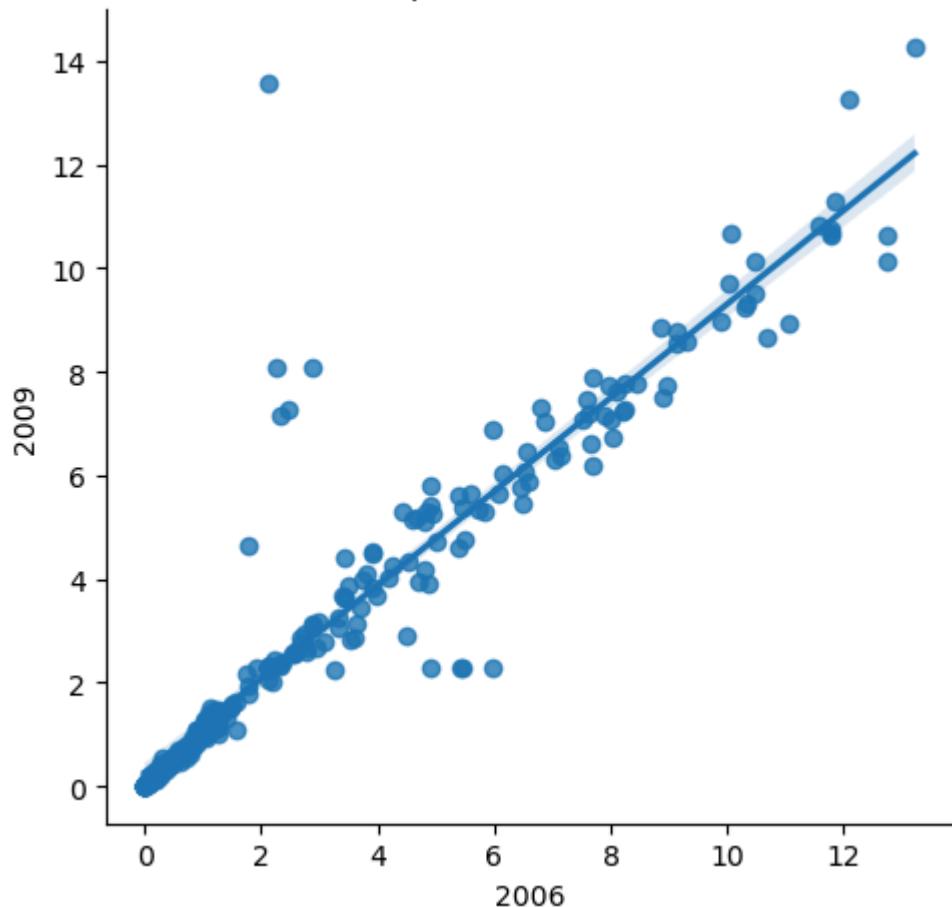
Scaterplot of 2006 vs 2008



Corelation between 2006 and 2008 : 0.9572936548101824

Corelation: Positively Corelated.

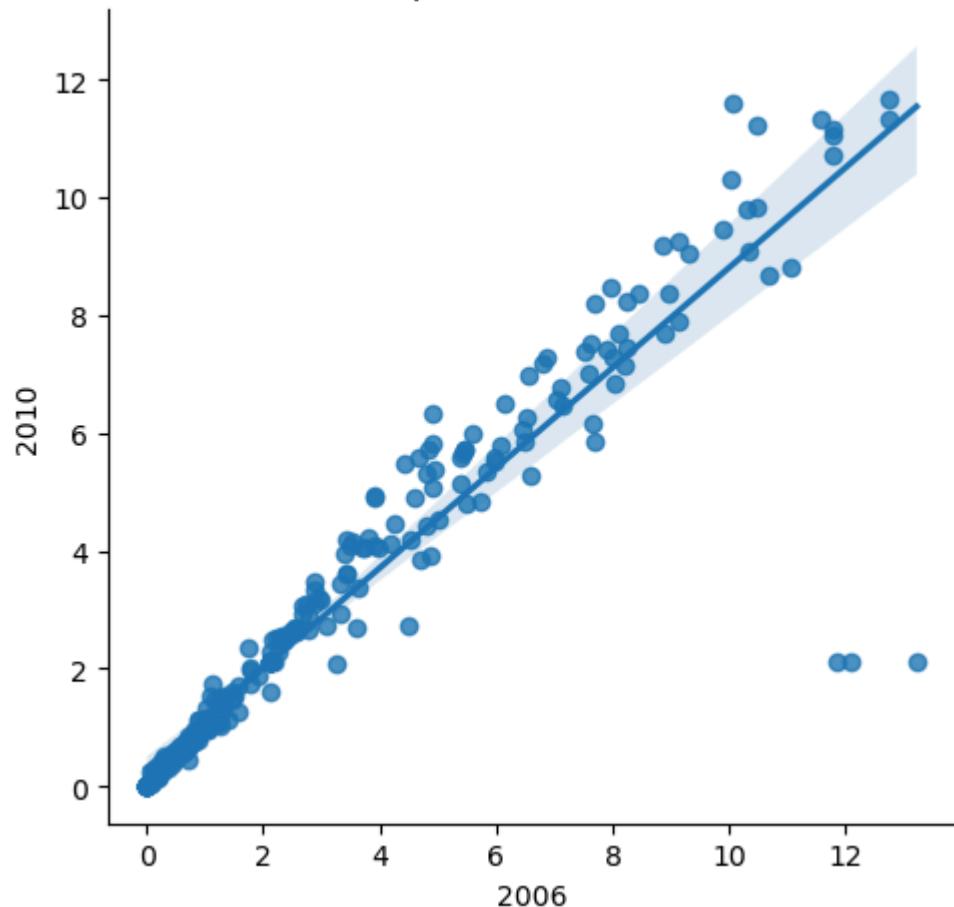
Scaterplot of 2006 vs 2009



Corelation between 2006 and 2009 : 0.939116061063509

Corelation: Positively Corelated.

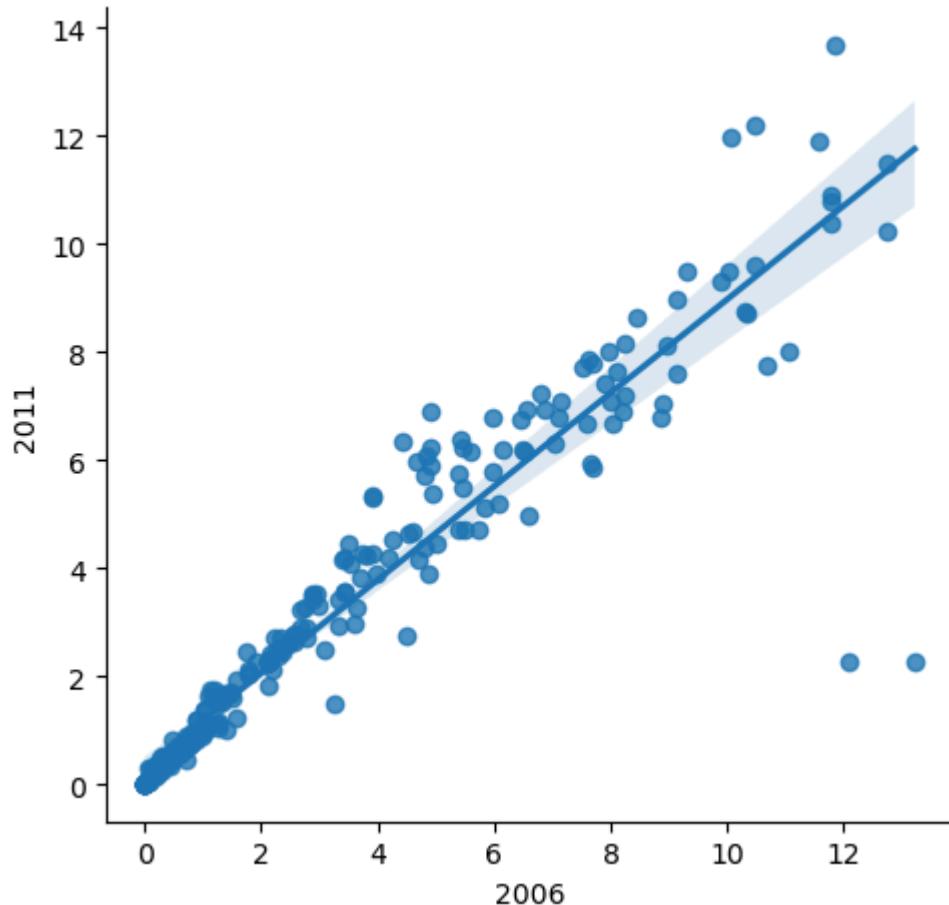
Scaterplot of 2006 vs 2010



Corelation between 2006 and 2010 : 0.935589241088742

Corelation: Positively Corelated.

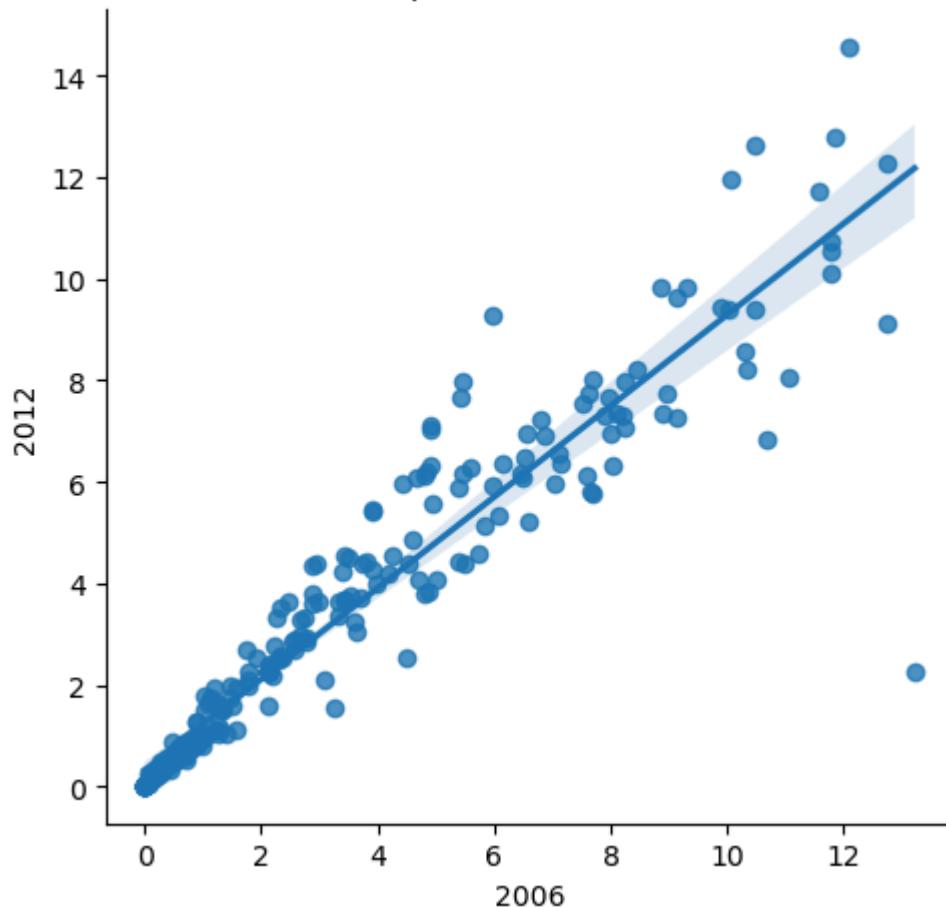
Scaterplot of 2006 vs 2011



Corelation between 2006 and 2011 : 0.9429380166483924

Corelation: Positively Corelated.

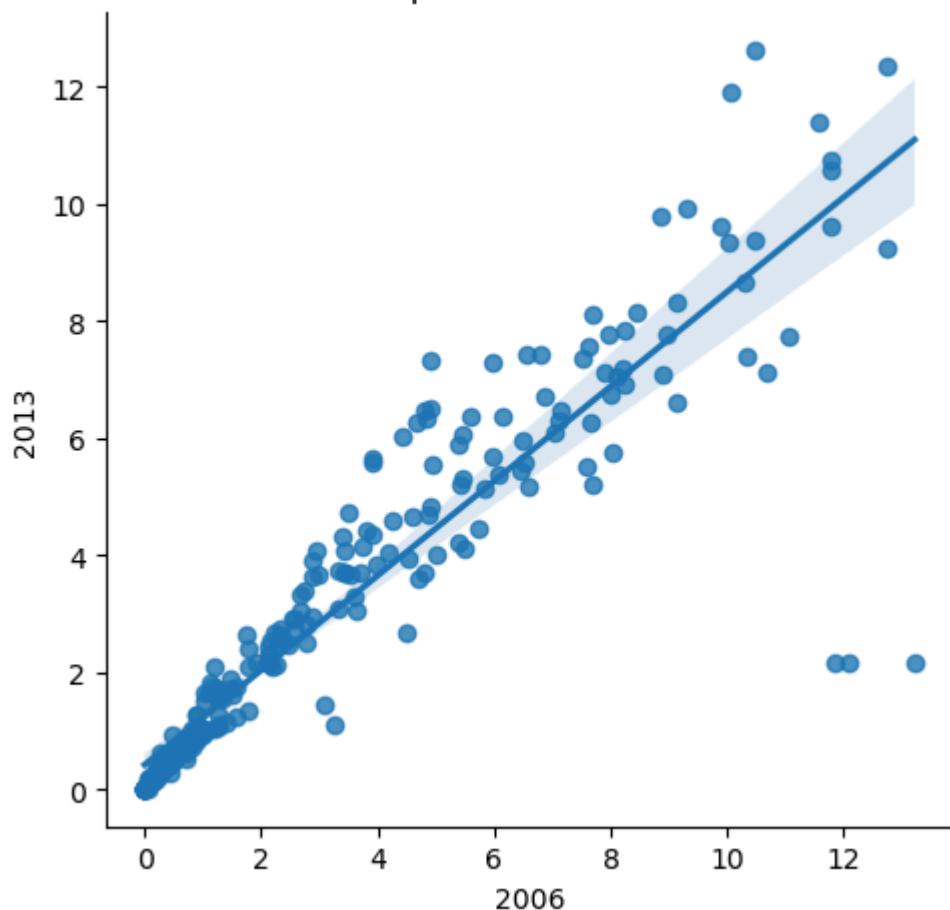
Scaterplot of 2006 vs 2012



Corelation between 2006 and 2012 : 0.947683356321102

Corelation: Positively Corelated.

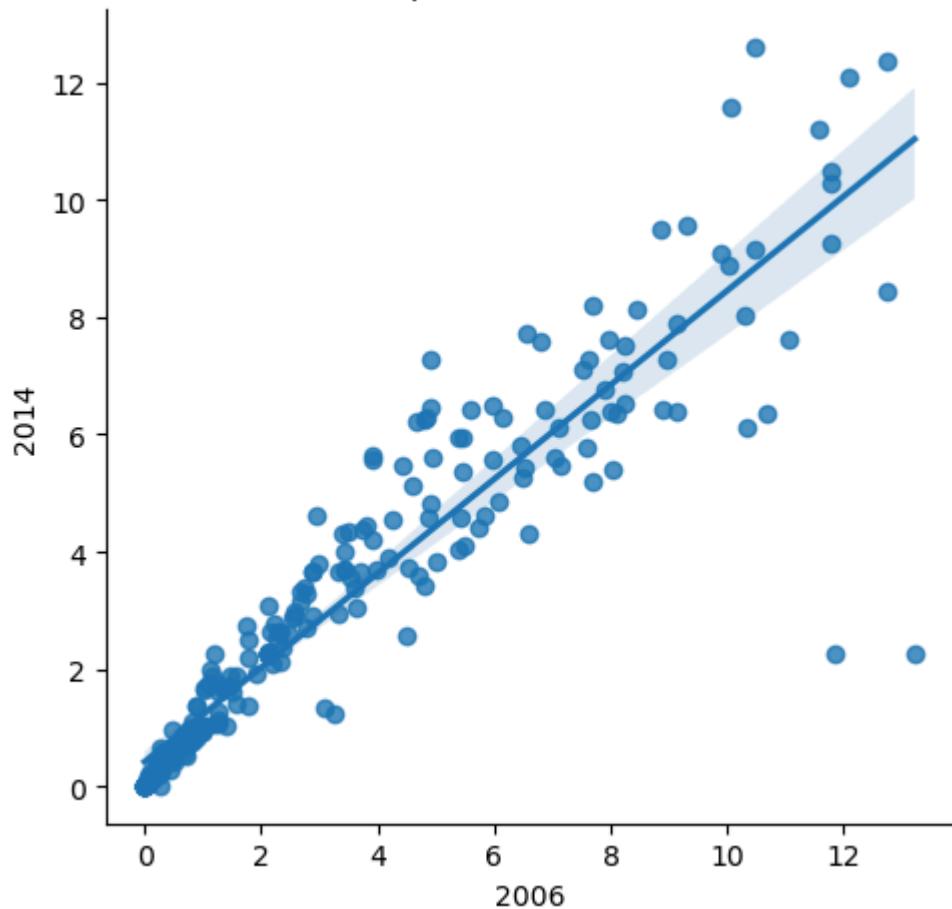
Scaterplot of 2006 vs 2013



Corelation between 2006 and 2013 : 0.9166423628925565

Corelation: Positively Corelated.

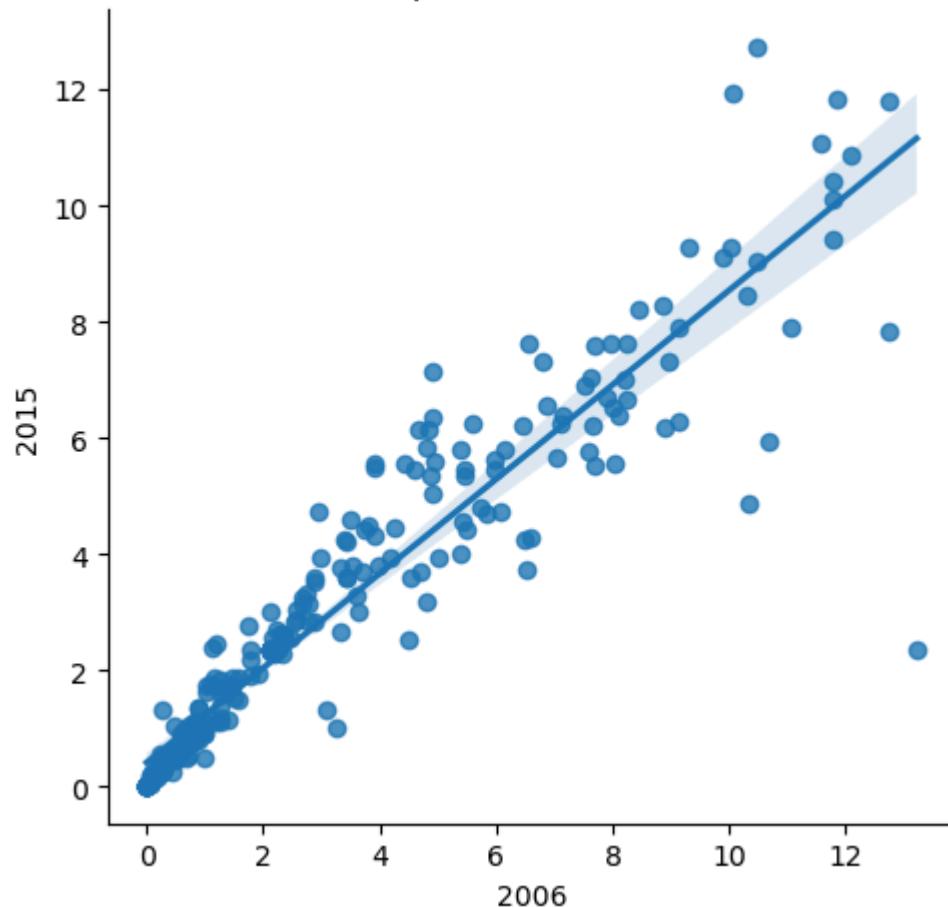
Scaterplot of 2006 vs 2014



Corelation between 2006 and 2014 : 0.9268991217894096

Corelation: Positively Corelated.

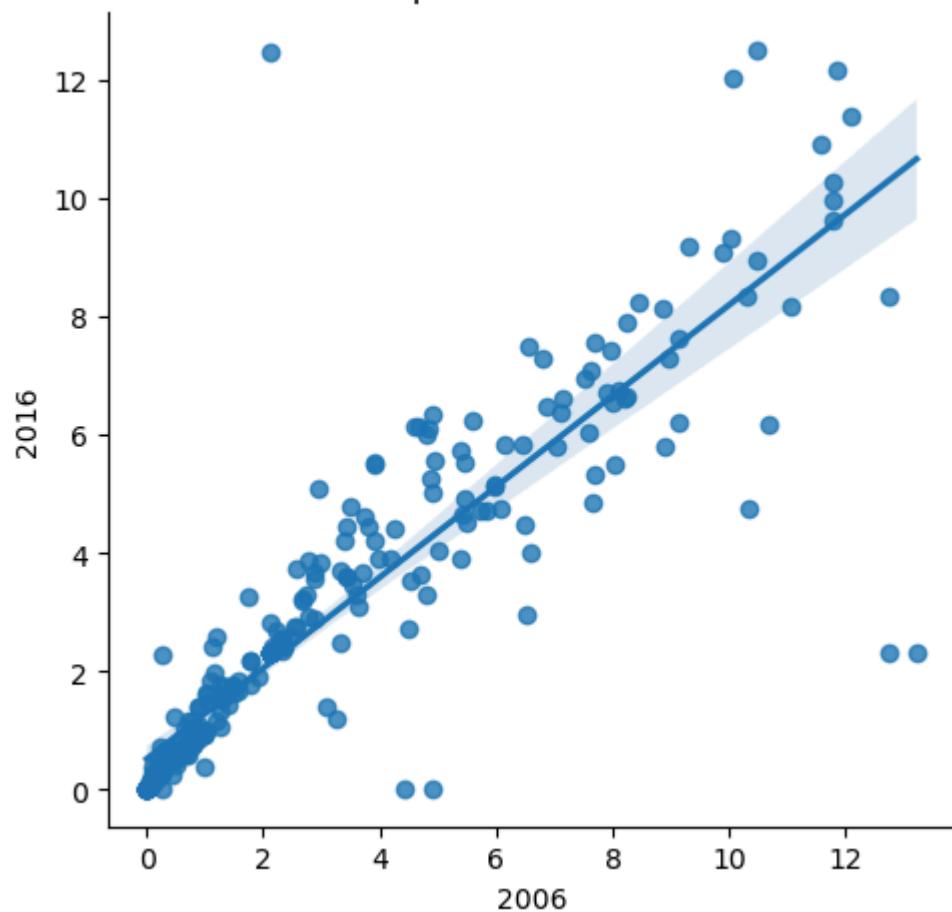
Scaterplot of 2006 vs 2015



Corelation between 2006 and 2015 : 0.9390792047309612

Corelation: Positively Corelated.

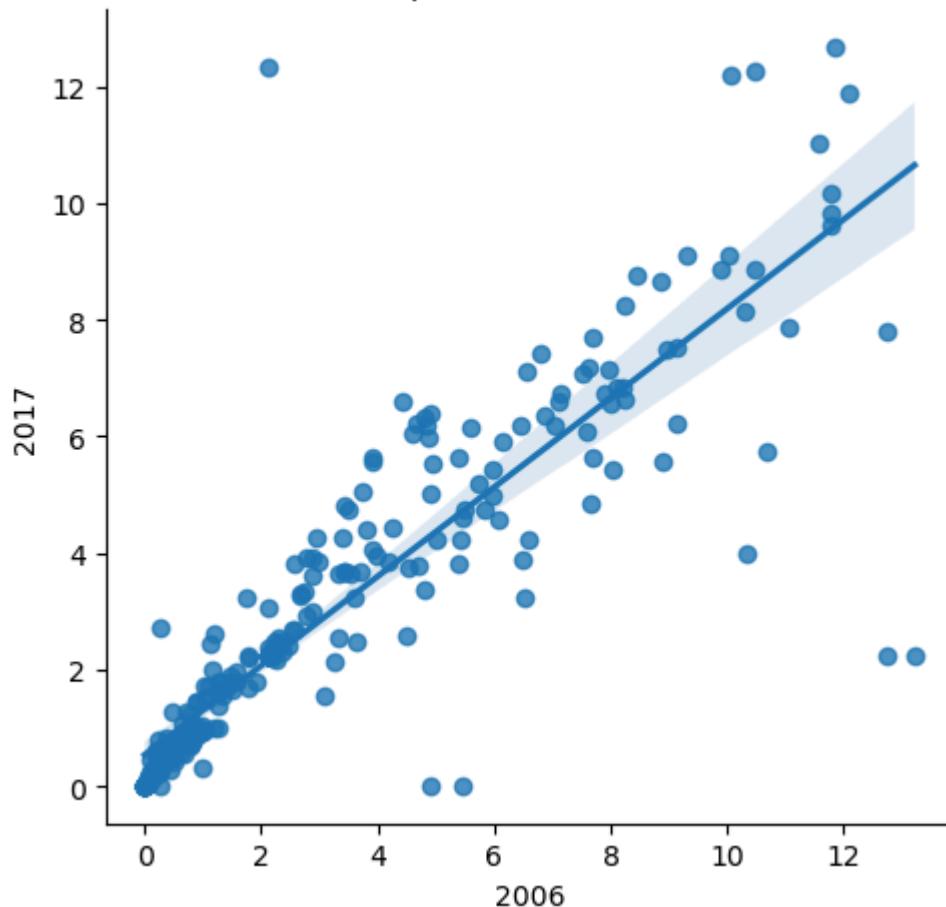
Scaterplot of 2006 vs 2016



Corelation between 2006 and 2016 : 0.8878199611194935

Corelation: Positively Corelated.

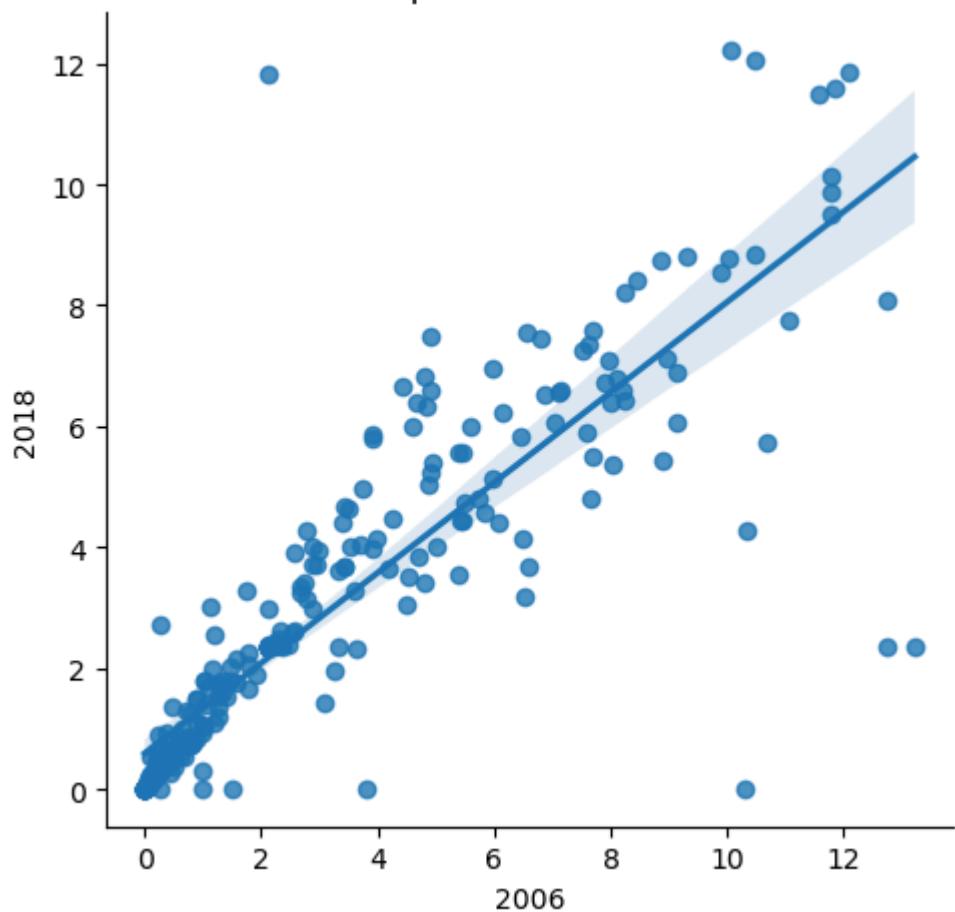
Scaterplot of 2006 vs 2017



Corelation between 2006 and 2017 : 0.8799805104950977

Corelation: Positively Corelated.

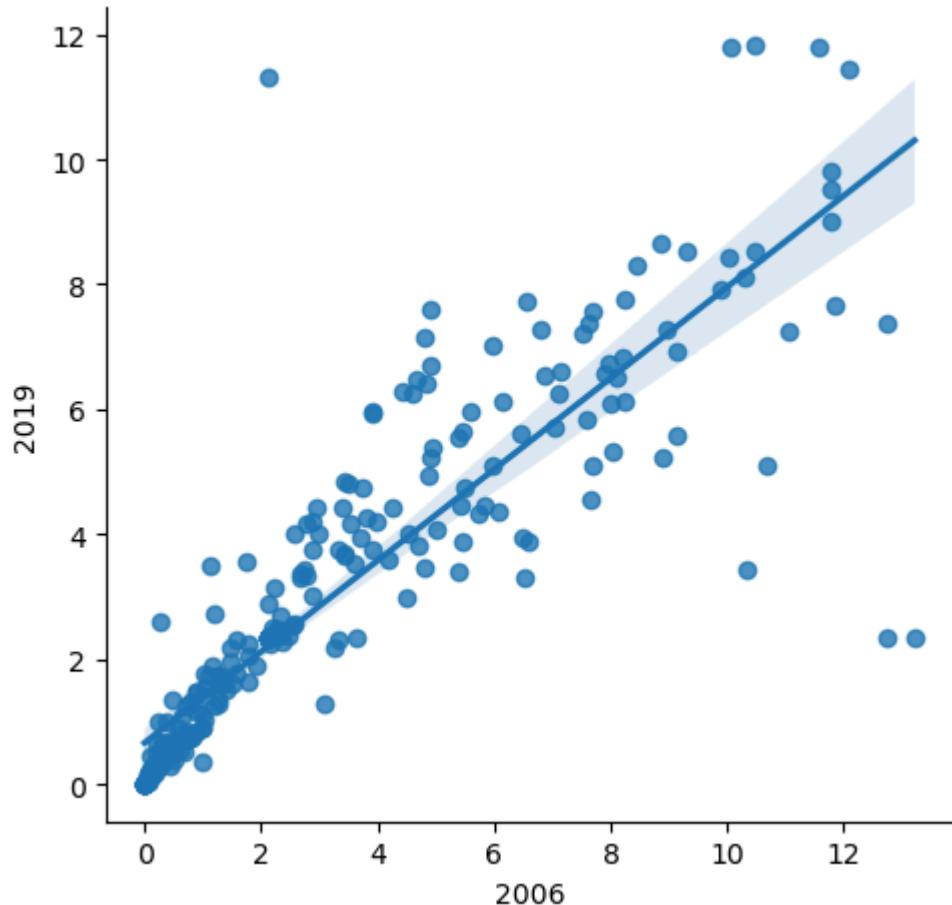
Scaterplot of 2006 vs 2018



Corelation between 2006 and 2018 : 0.8656097323088213

Corelation: Positively Corelated.

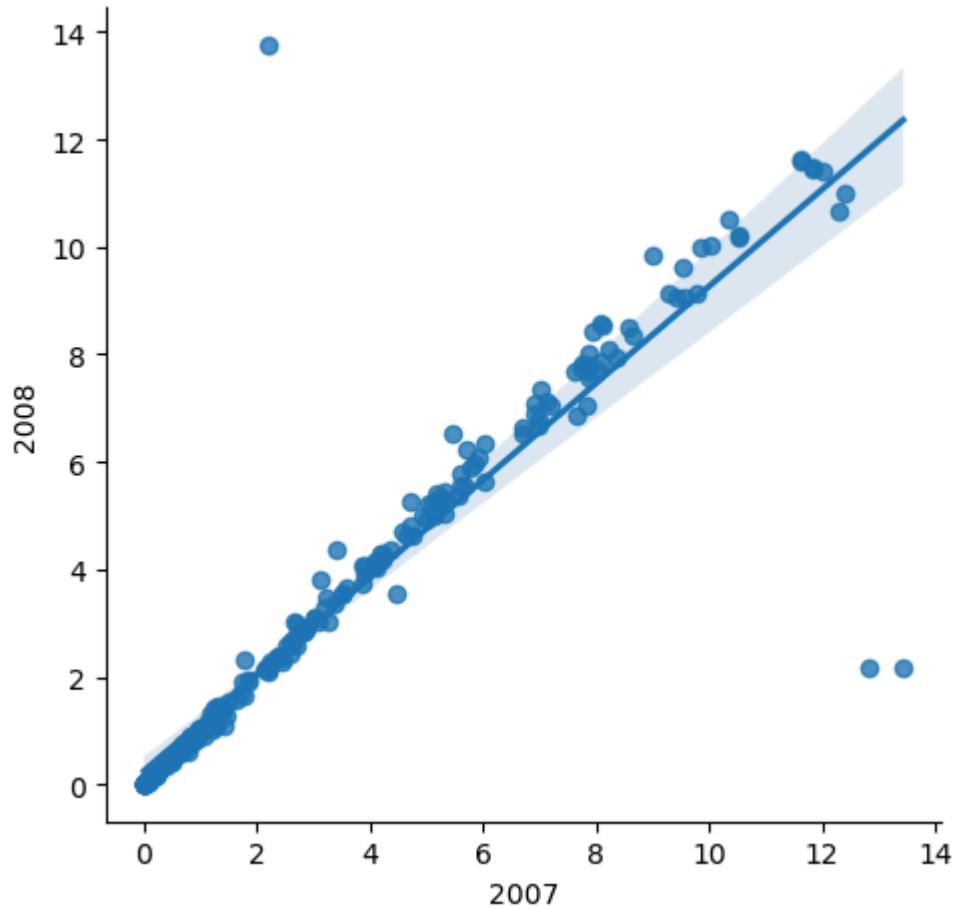
Scaterplot of 2006 vs 2019



Corelation between 2006 and 2019 : 0.8757613918800019

Corelation: Positively Corelated.

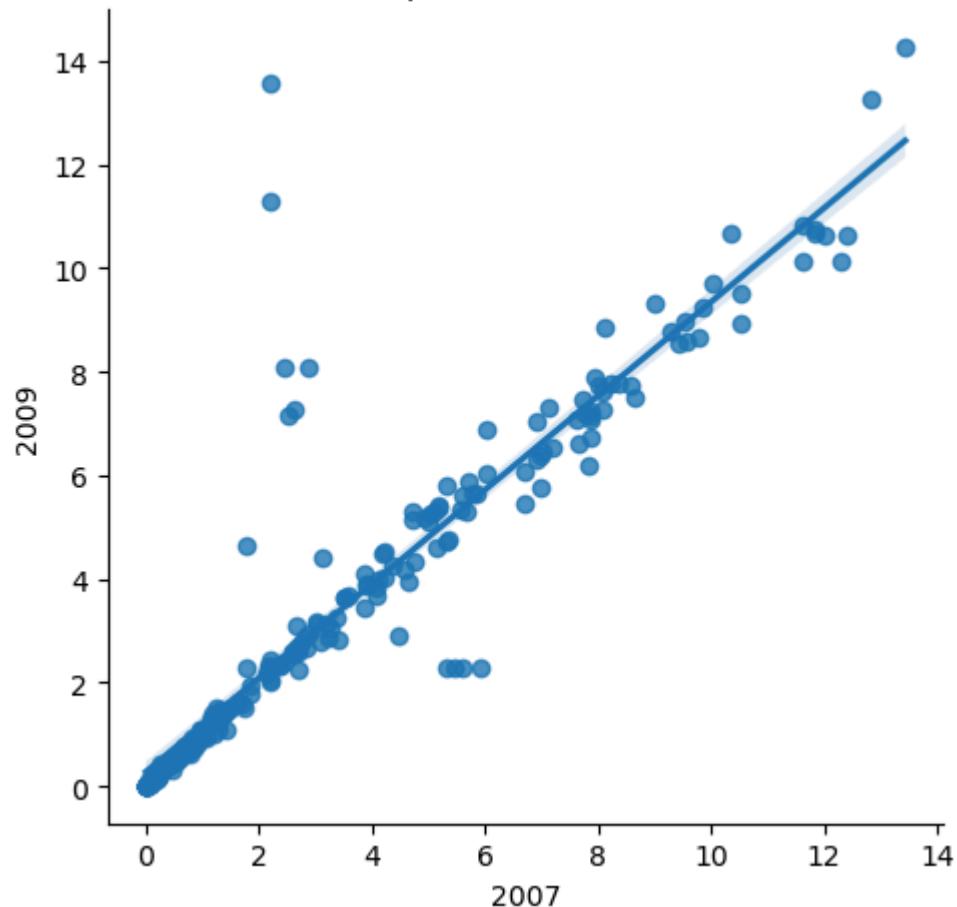
Scaterplot of 2007 vs 2008



Corelation between 2007 and 2008 : 0.9308470422480138

Corelation: Positively Corelated.

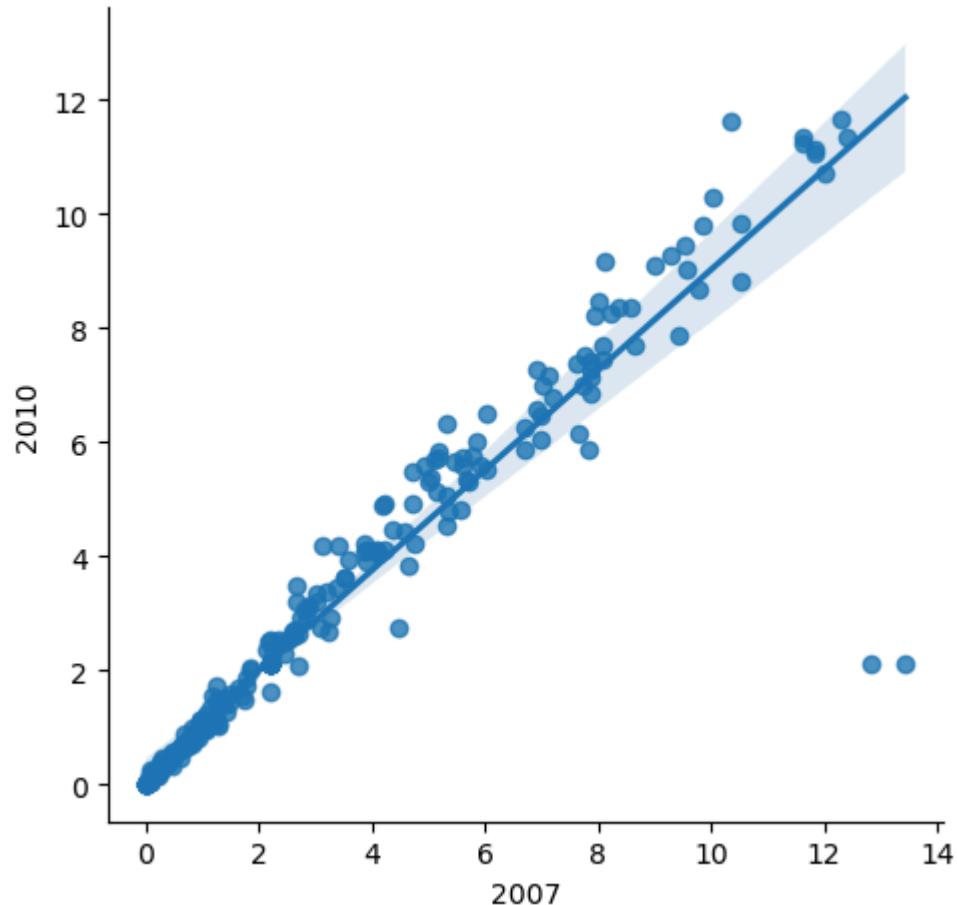
Scaterplot of 2007 vs 2009



Corelation between 2007 and 2009 : 0.9261324966153777

Corelation: Positively Corelated.

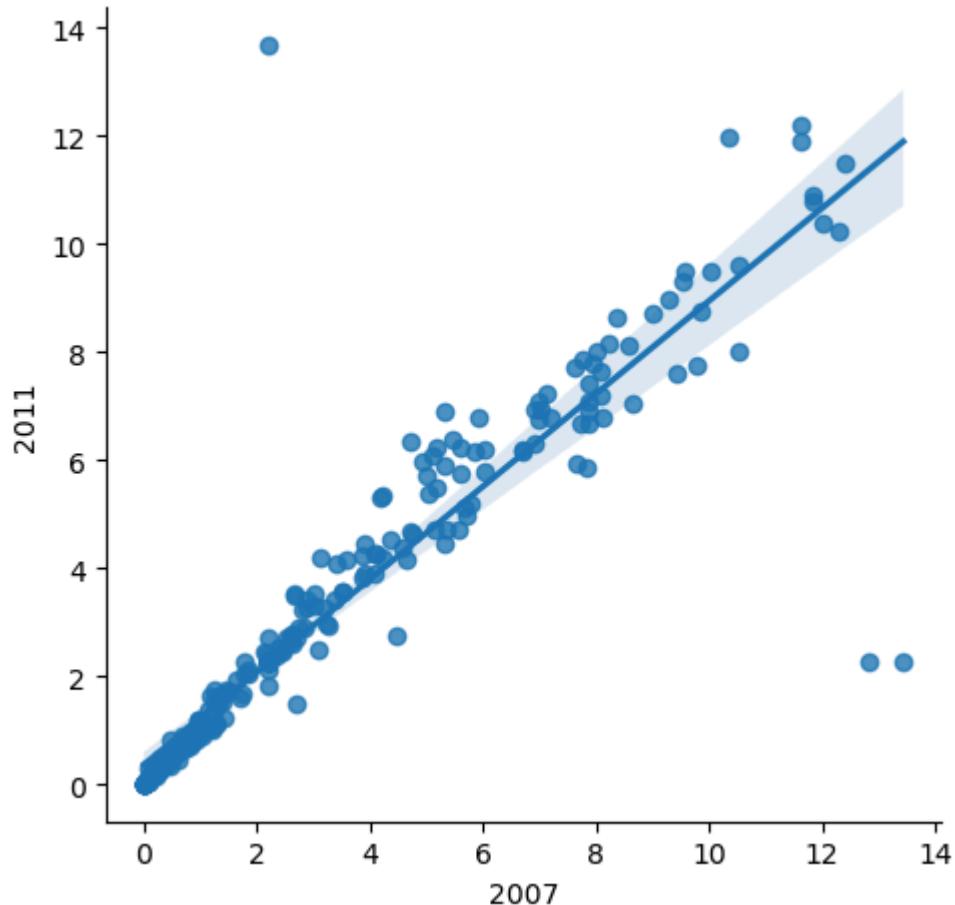
Scaterplot of 2007 vs 2010



Corelation between 2007 and 2010 : 0.9499986270313917

Corelation: Positively Corelated.

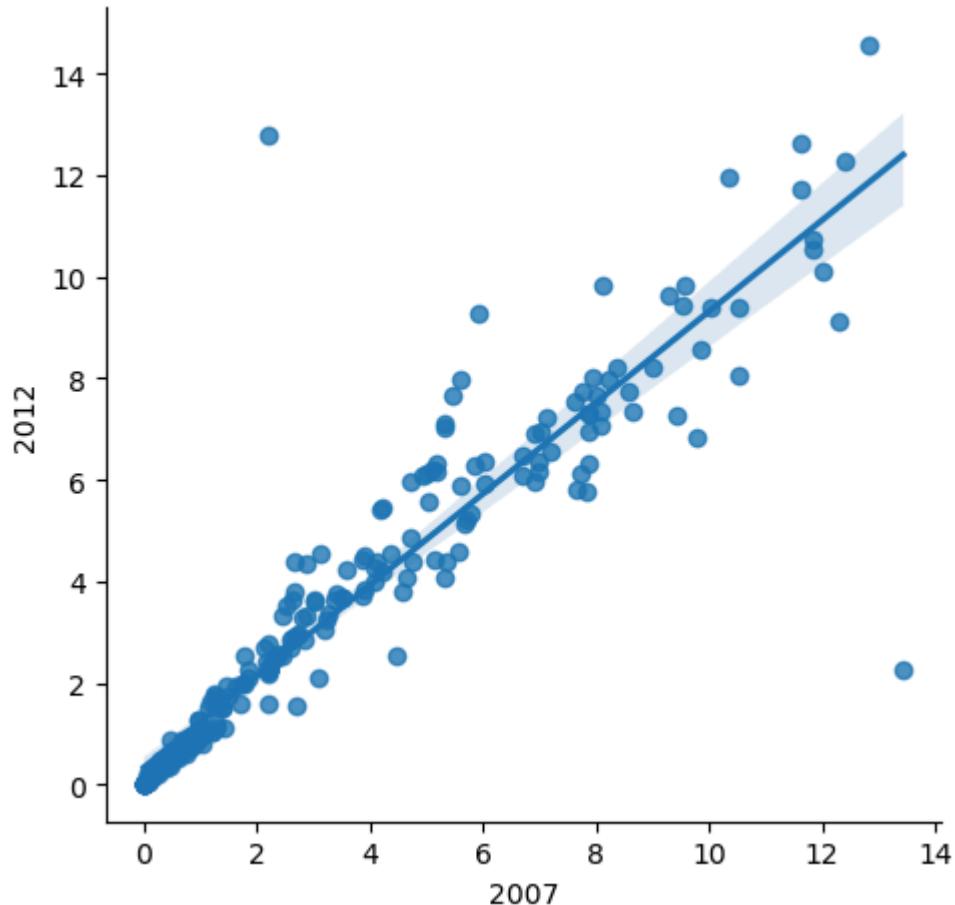
Scaterplot of 2007 vs 2011



Corelation between 2007 and 2011 : 0.919665506060923

Corelation: Positively Corelated.

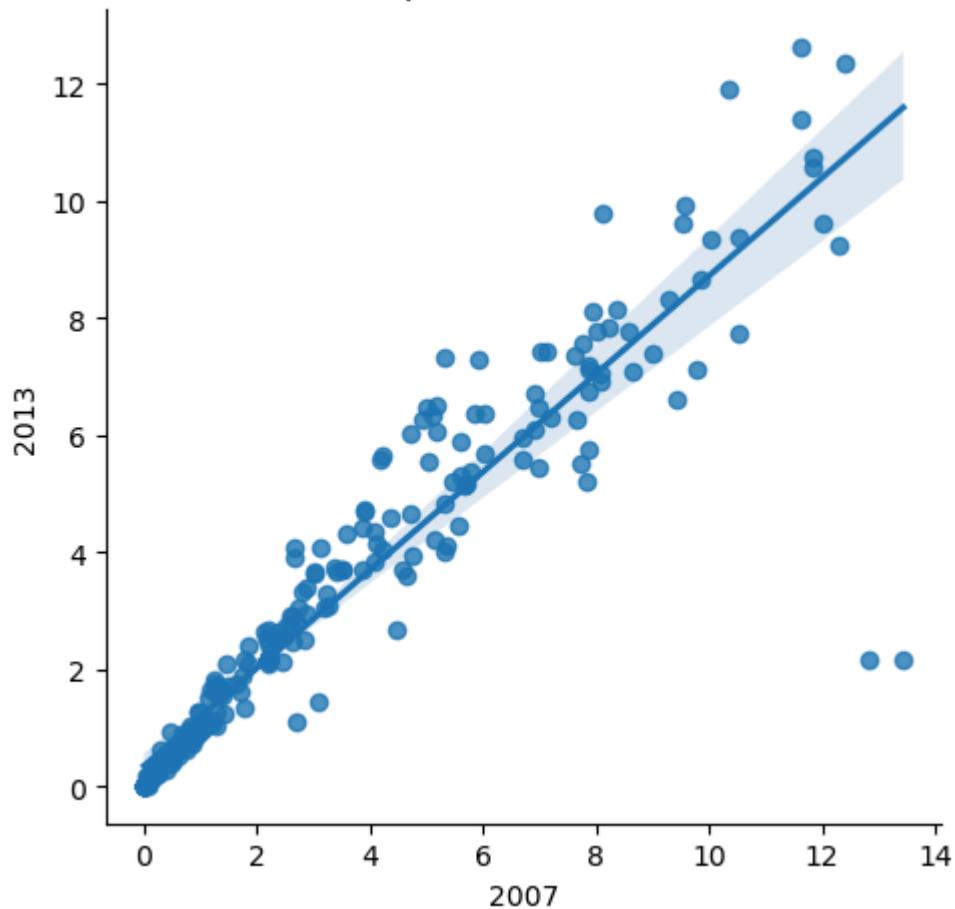
Scaterplot of 2007 vs 2012



Corelation between 2007 and 2012 : 0.9326100484071809

Corelation: Positively Corelated.

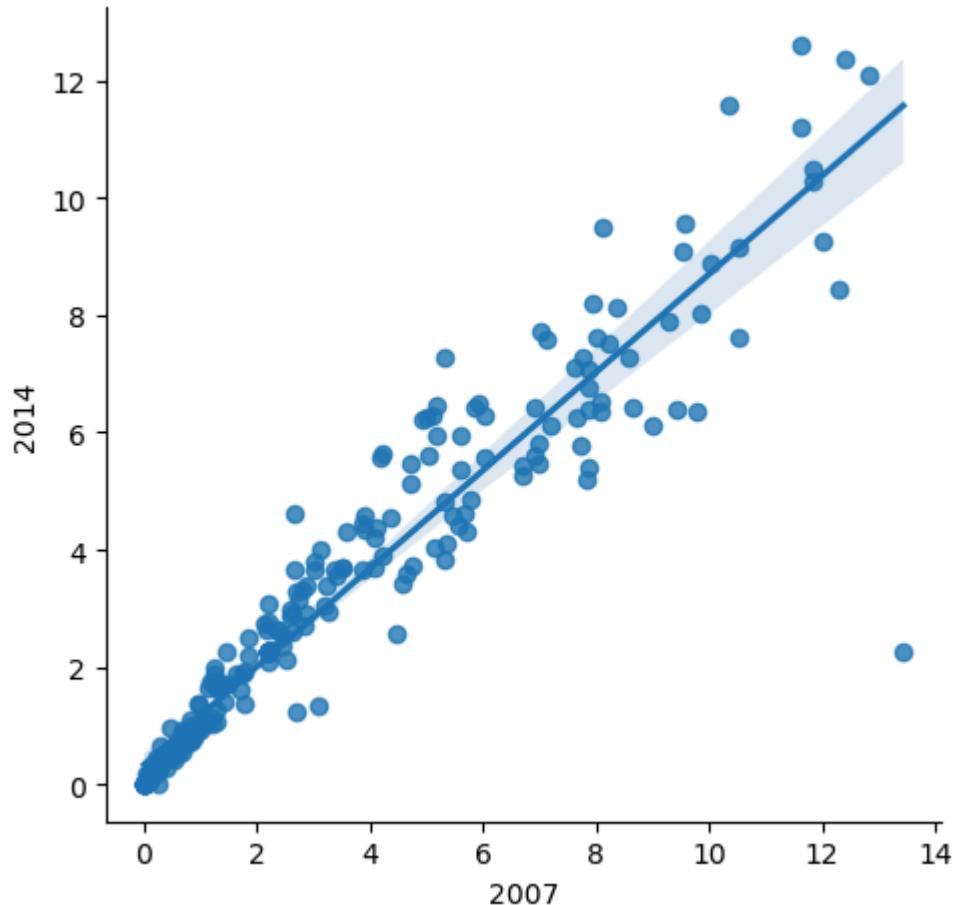
Scaterplot of 2007 vs 2013



Corelation between 2007 and 2013 : 0.9339708975781292

Corelation: Positively Corelated.

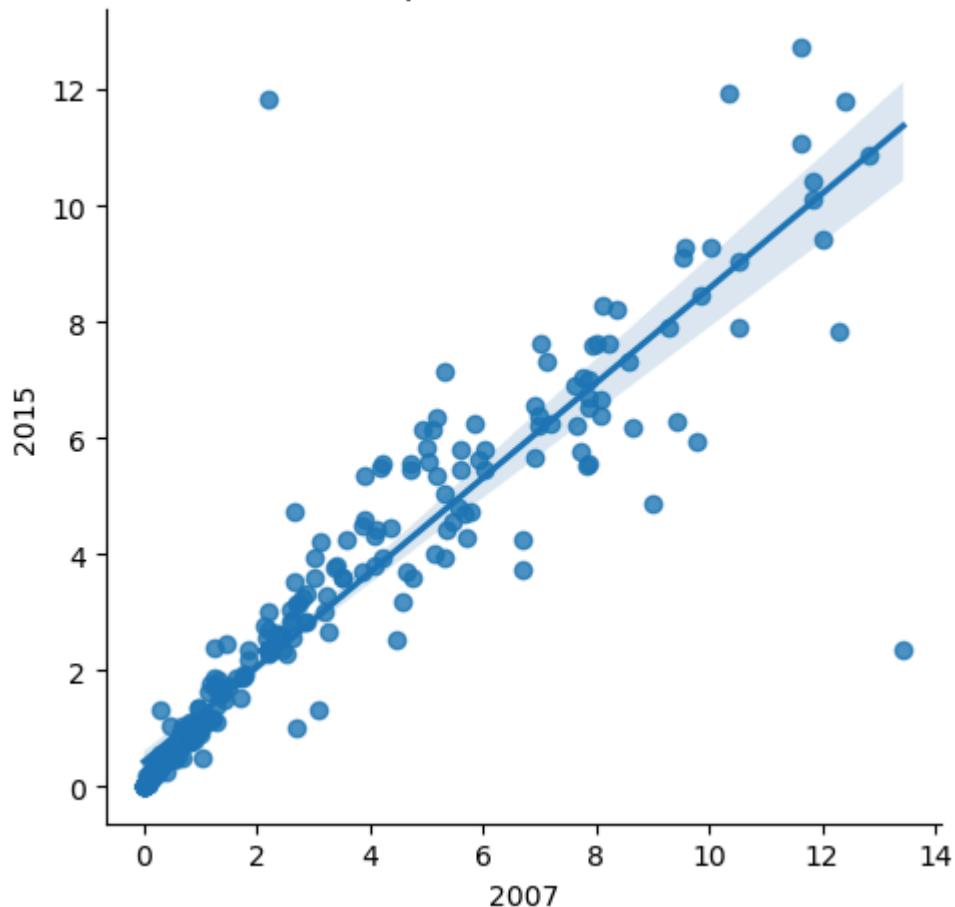
Scaterplot of 2007 vs 2014



Corelation between 2007 and 2014 : 0.9487789316720162

Corelation: Positively Corelated.

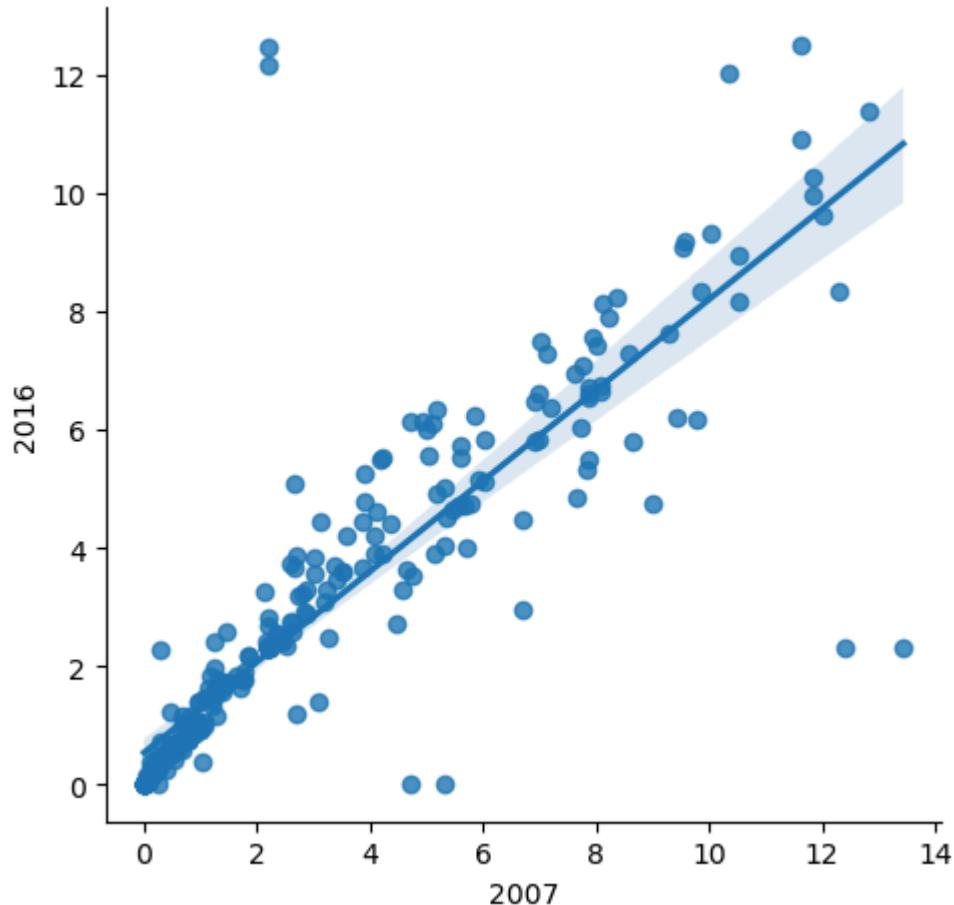
Scaterplot of 2007 vs 2015



Corelation between 2007 and 2015 : 0.9253505726189414

Corelation: Positively Corelated.

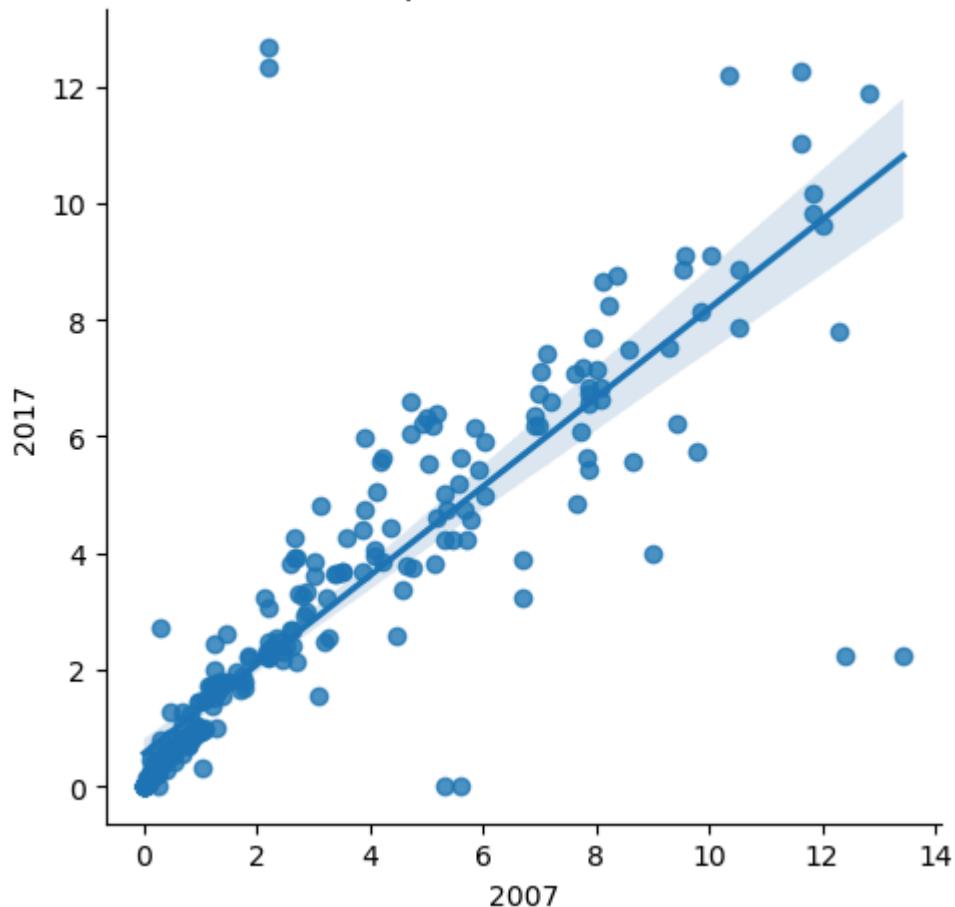
Scaterplot of 2007 vs 2016



Corelation between 2007 and 2016 : 0.8715775989584141

Corelation: Positively Corelated.

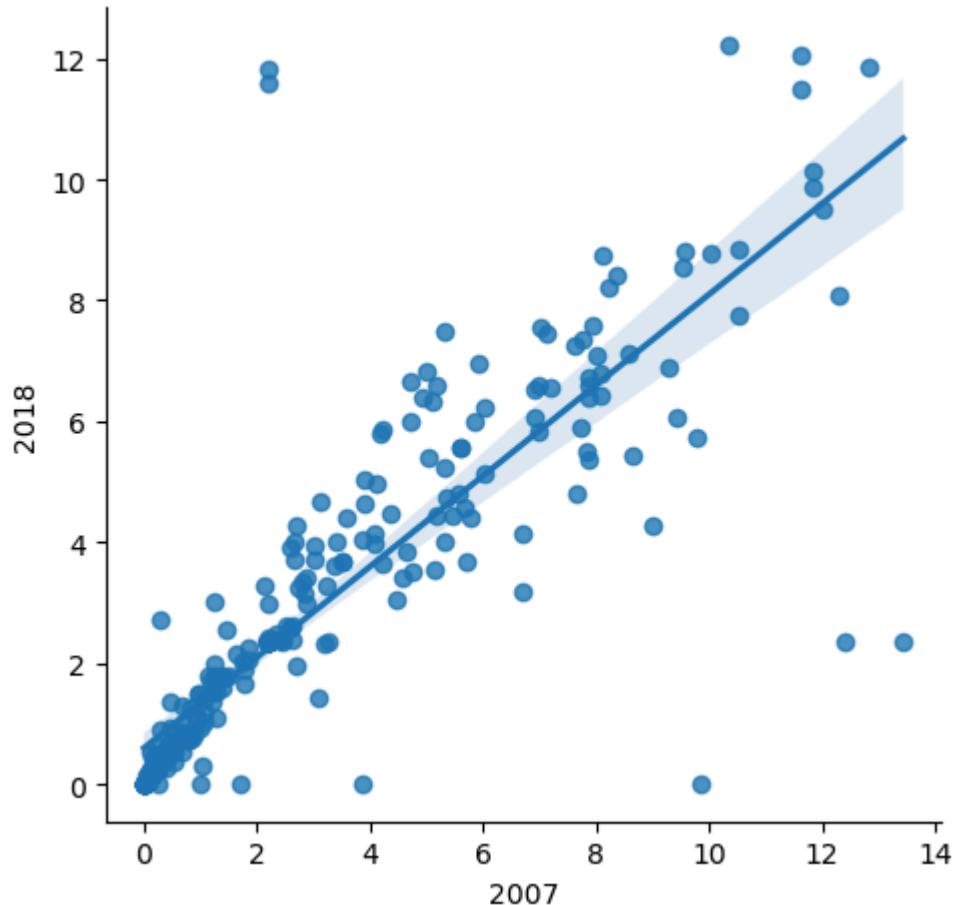
Scaterplot of 2007 vs 2017



Corelation between 2007 and 2017 : 0.8625002261406045

Corelation: Positively Corelated.

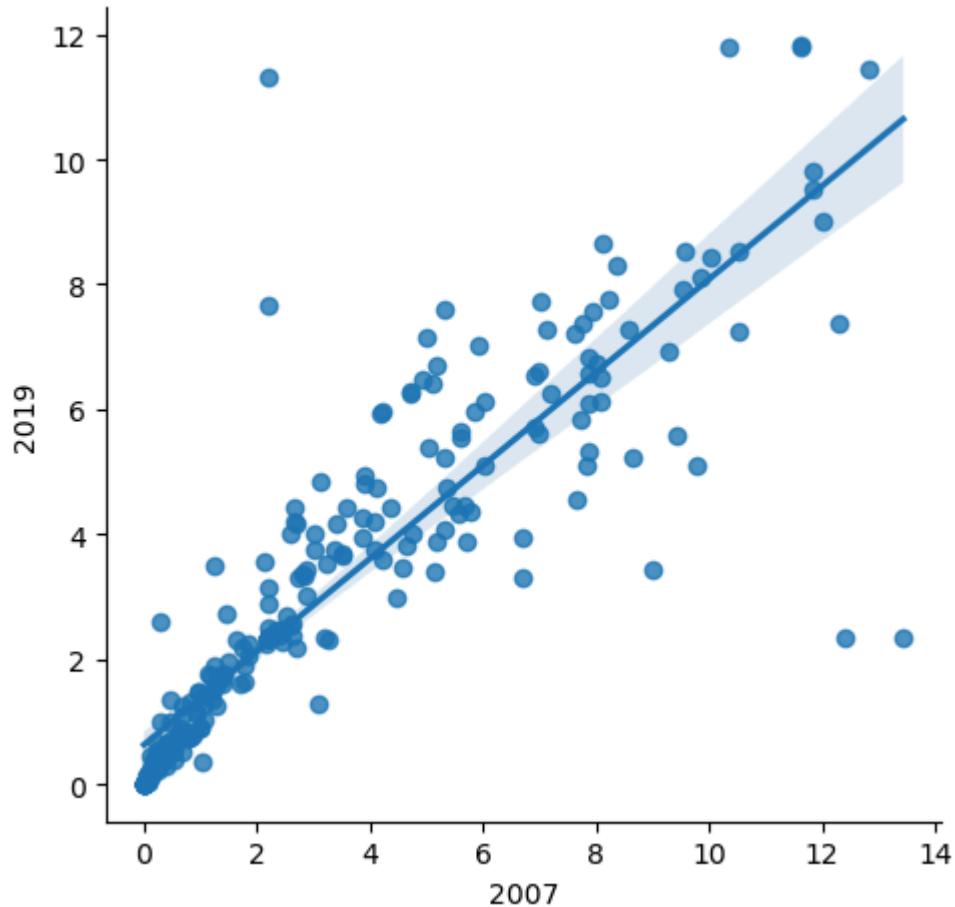
Scaterplot of 2007 vs 2018



Corelation between 2007 and 2018 : 0.8553449090627299

Corelation: Positively Corelated.

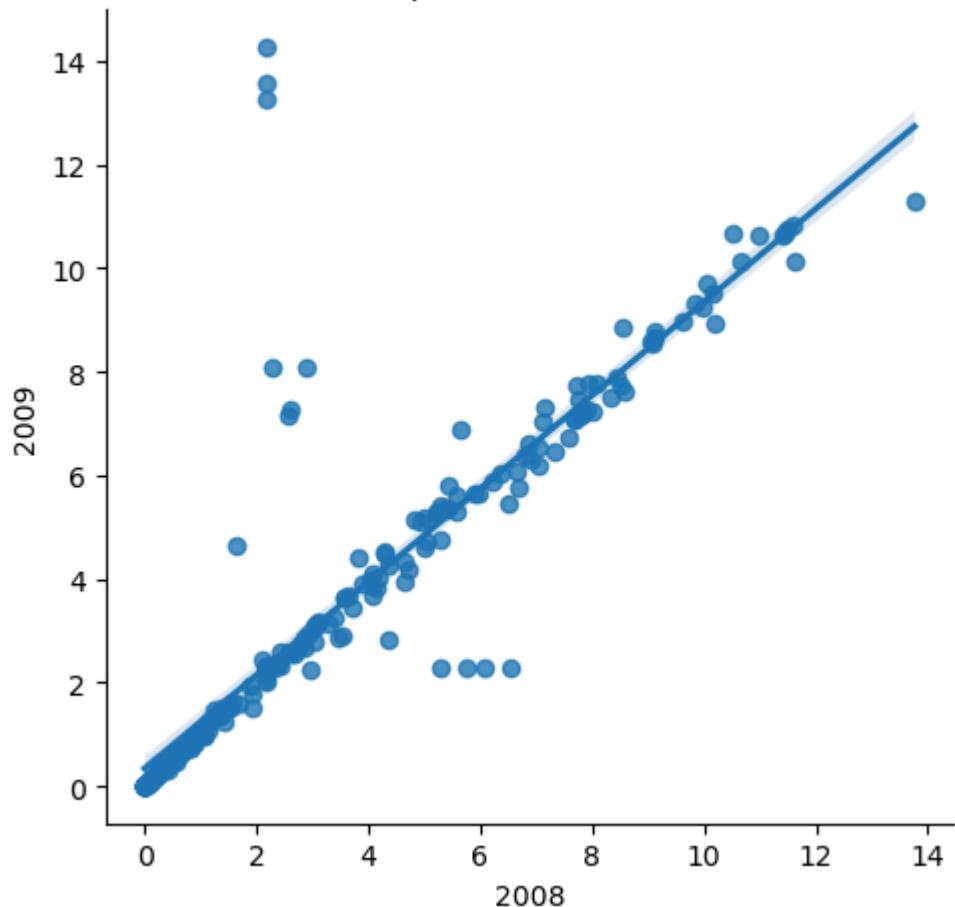
Scaterplot of 2007 vs 2019



Corelation between 2007 and 2019 : 0.8797089238912117

Corelation: Positively Corelated.

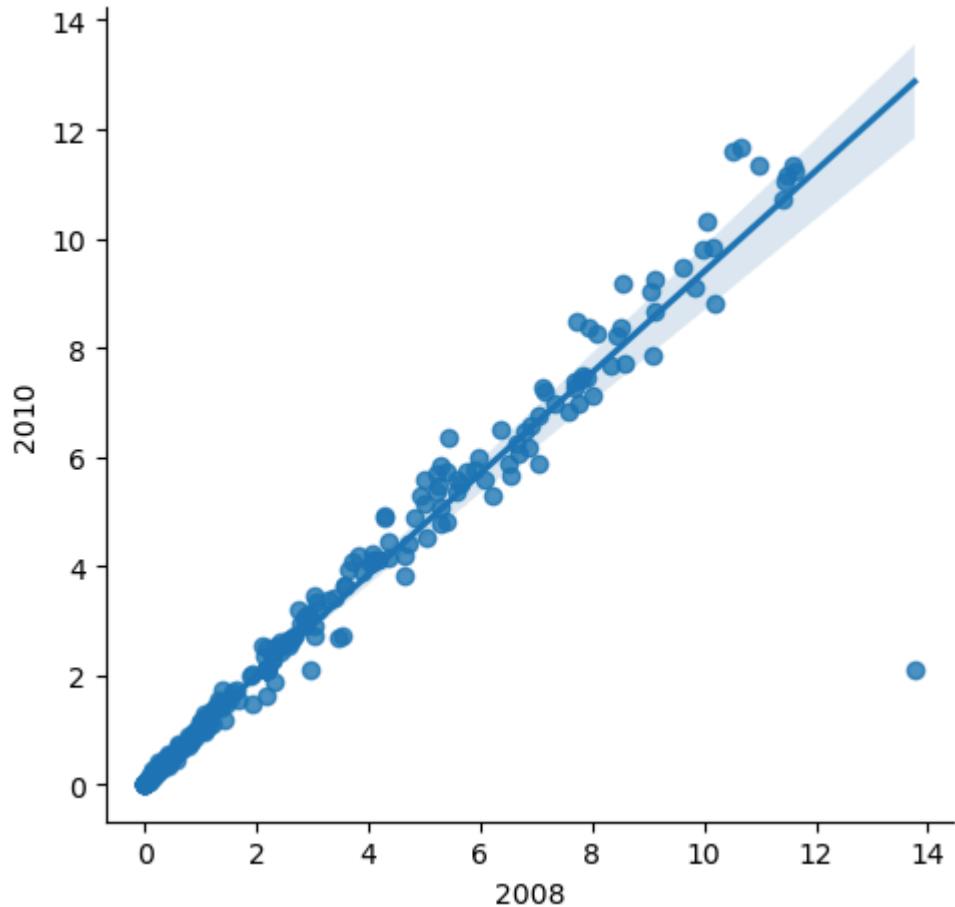
Scaterplot of 2008 vs 2009



Corelation between 2008 and 2009 : 0.8903594032661942

Corelation: Positively Corelated.

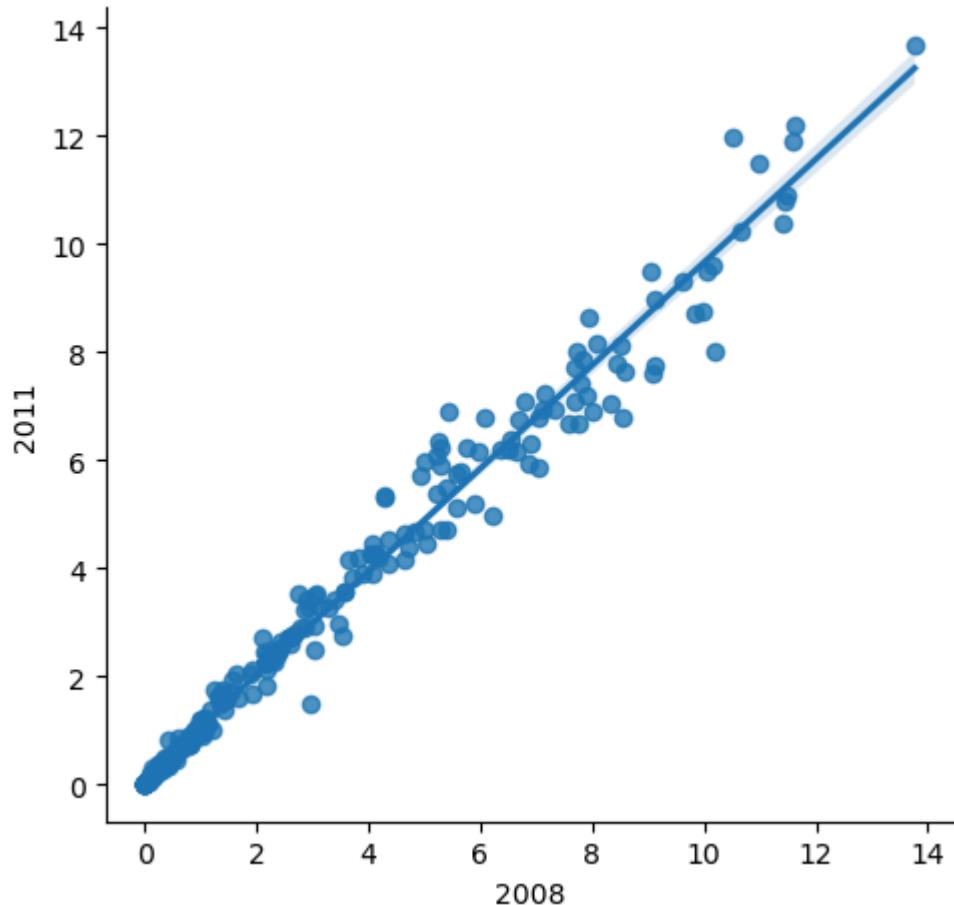
Scaterplot of 2008 vs 2010



Corelation between 2008 and 2010 : 0.9697757761971364

Corelation: Positively Corelated.

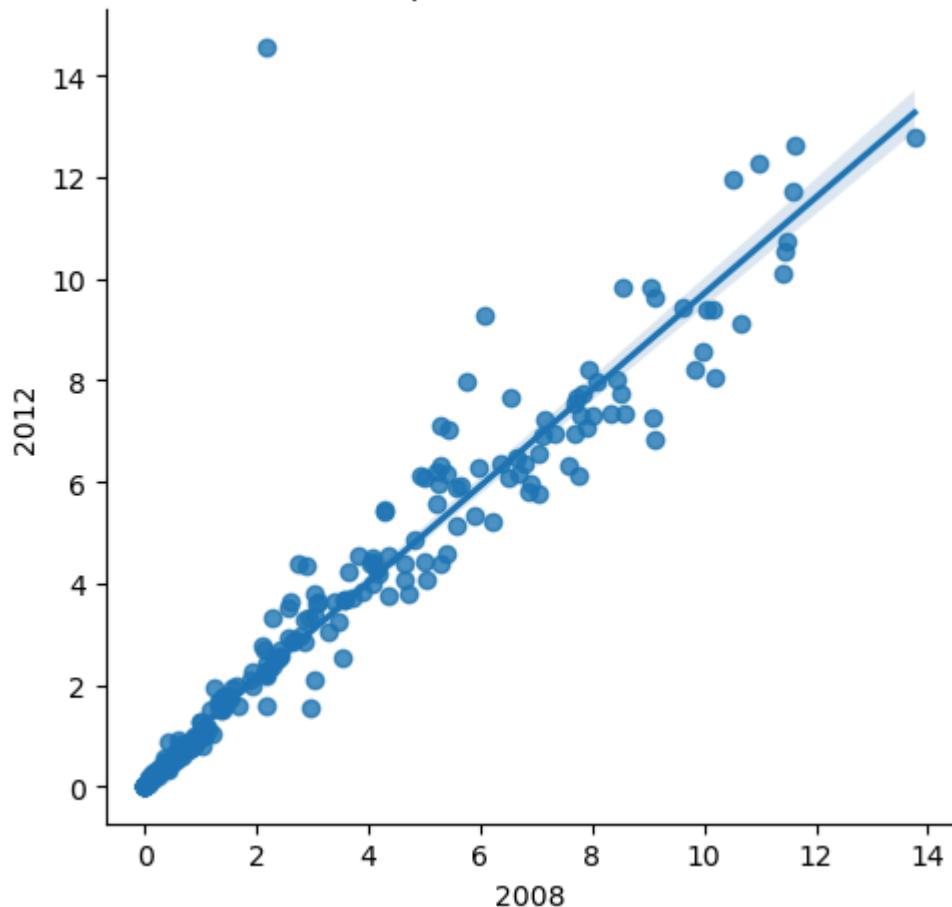
Scaterplot of 2008 vs 2011



Corelation between 2008 and 2011 : 0.9903215891205434

Corelation: Positively Corelated.

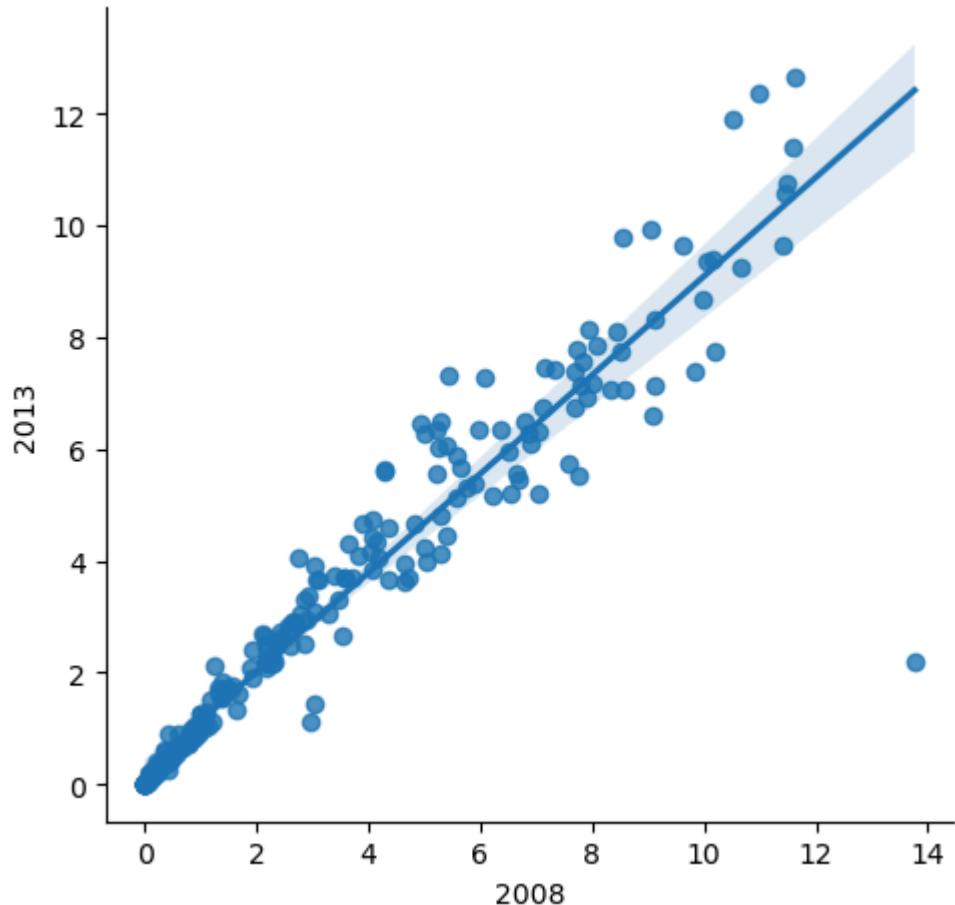
Scaterplot of 2008 vs 2012



Corelation between 2008 and 2012 : 0.9526112602690736

Corelation: Positively Corelated.

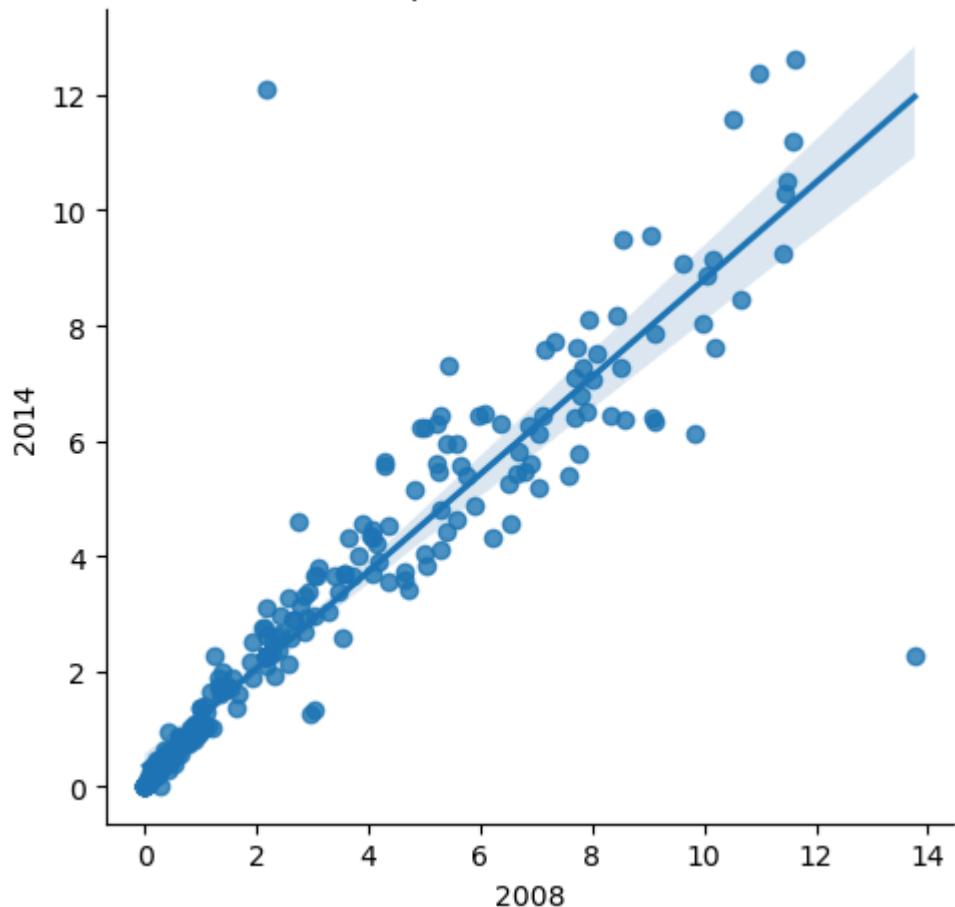
Scaterplot of 2008 vs 2013



Corelation between 2008 and 2013 : 0.9550471139516261

Corelation: Positively Corelated.

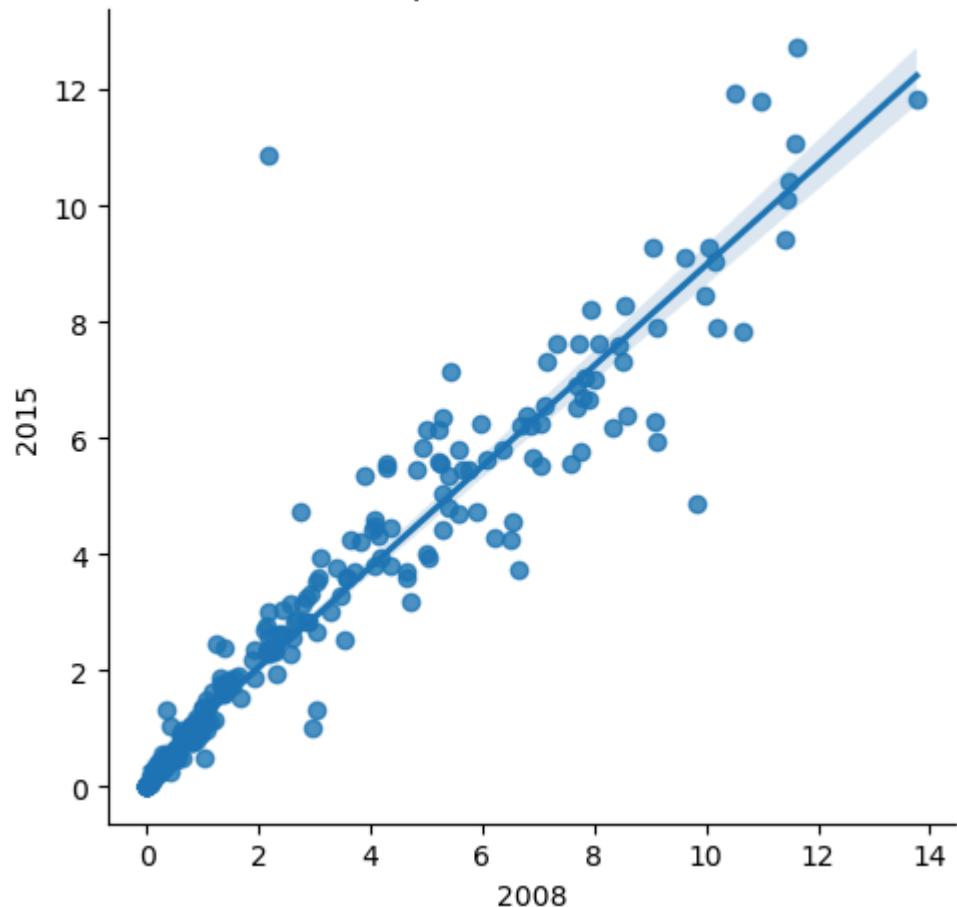
Scaterplot of 2008 vs 2014



Corelation between 2008 and 2014 : 0.9272342609218818

Corelation: Positively Corelated.

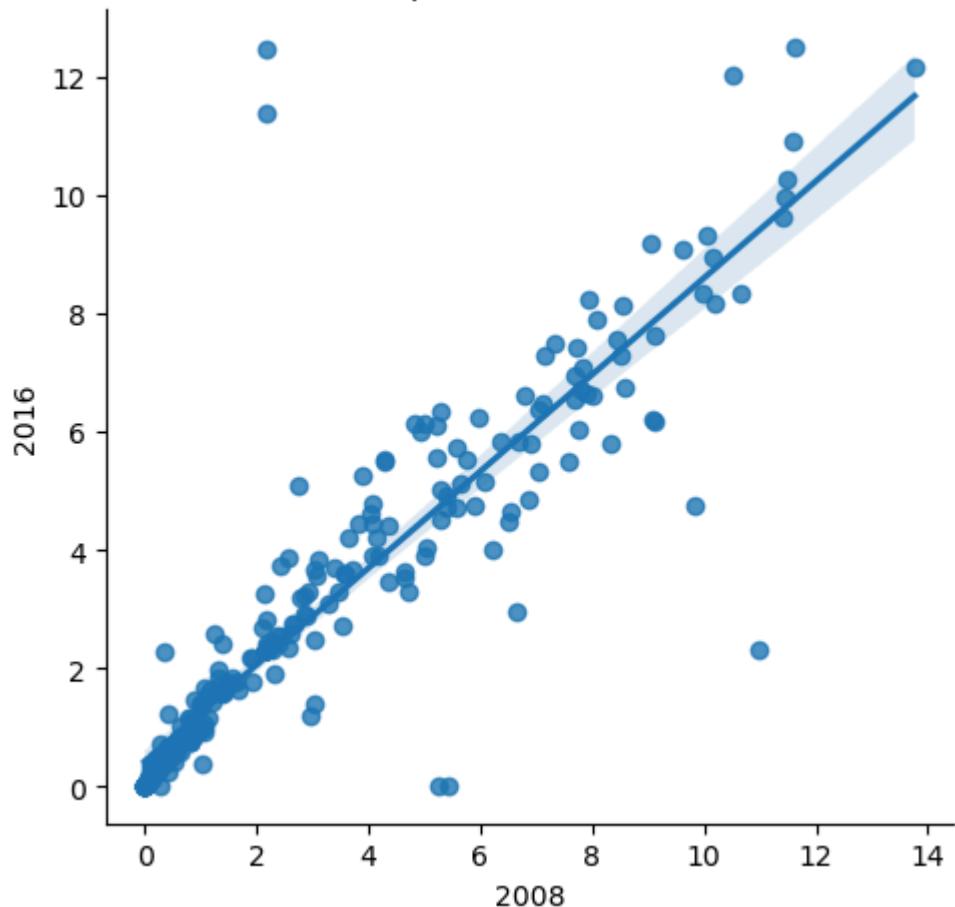
Scaterplot of 2008 vs 2015



Corelation between 2008 and 2015 : 0.9530036729537245

Corelation: Positively Corelated.

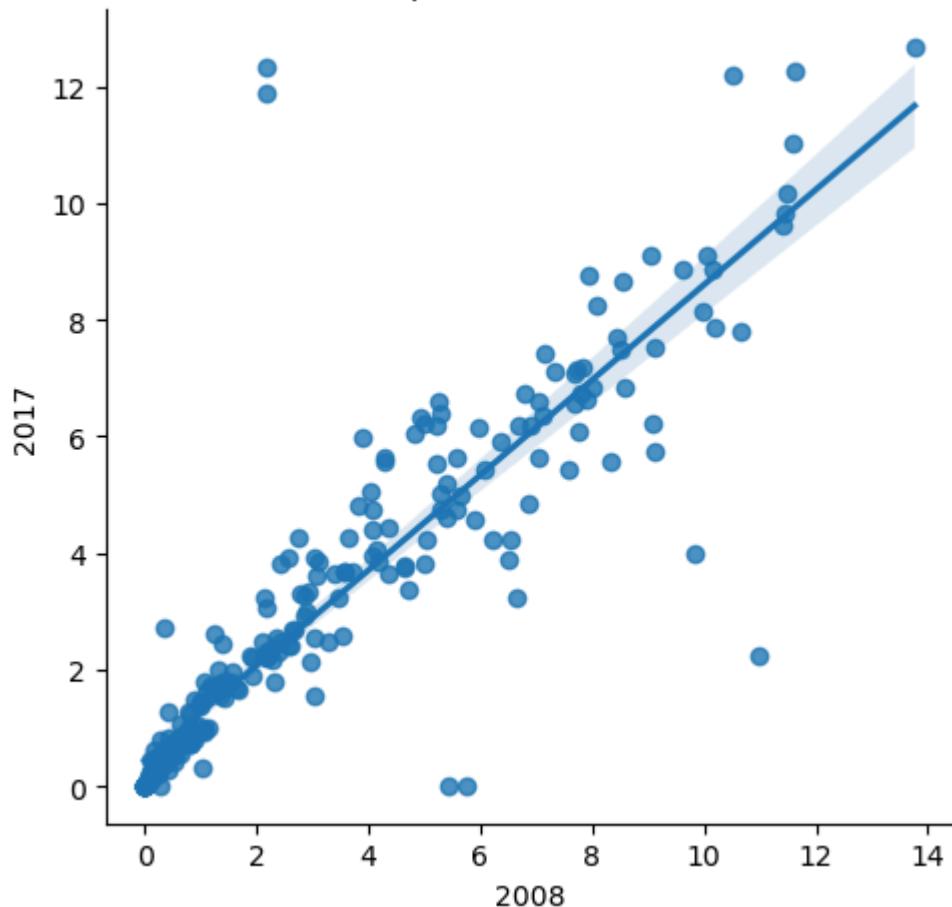
Scaterplot of 2008 vs 2016



Corelation between 2008 and 2016 : 0.9005775104500685

Corelation: Positively Corelated.

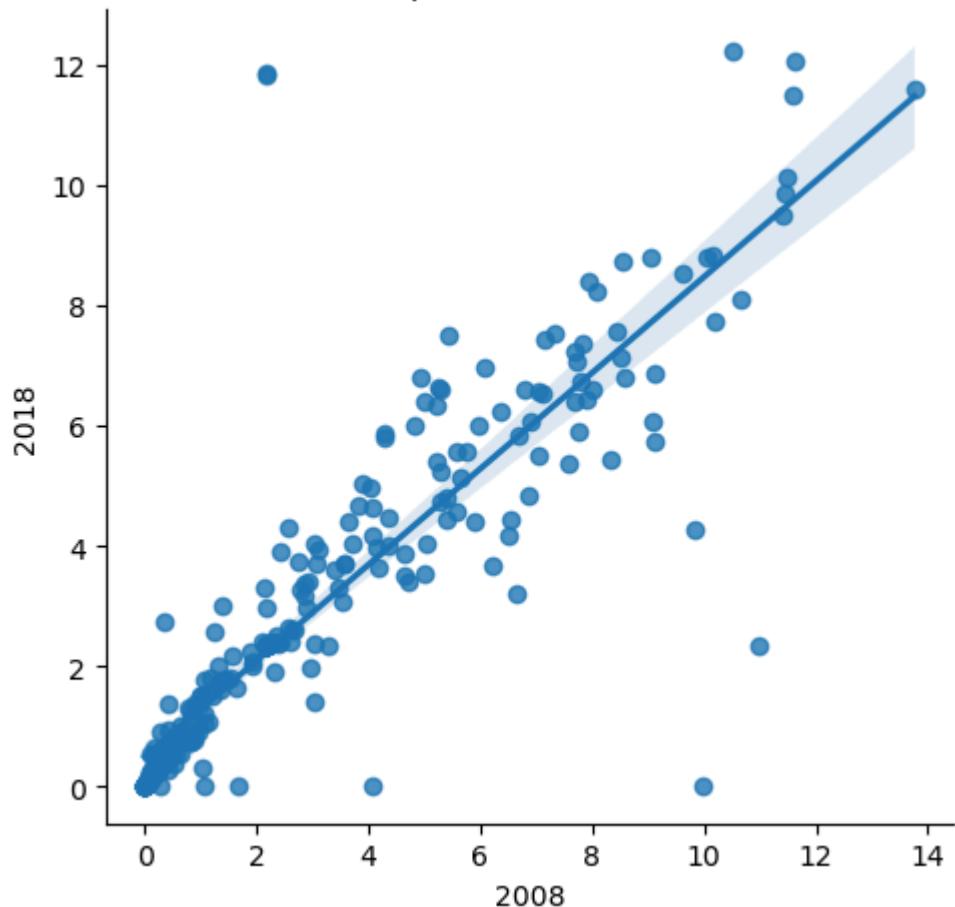
Scaterplot of 2008 vs 2017



Corelation between 2008 and 2017 : 0.8934178774235383

Corelation: Positively Corelated.

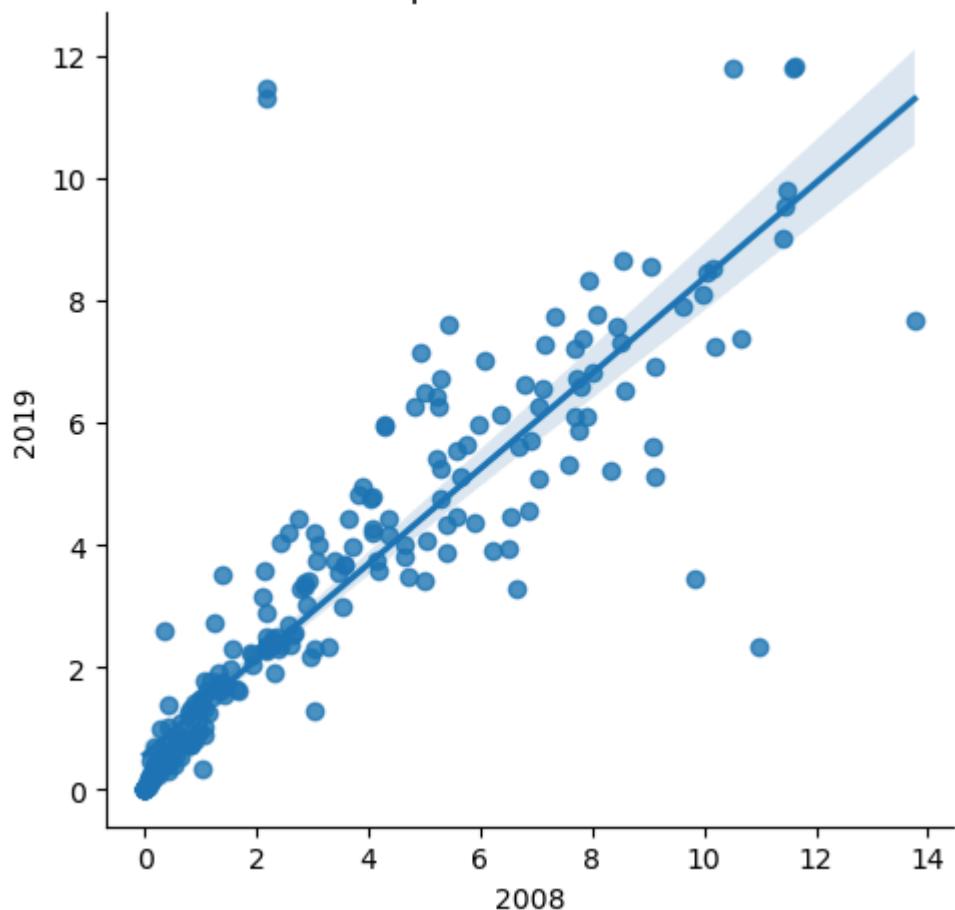
Scaterplot of 2008 vs 2018



Corelation between 2008 and 2018 : 0.8808111560578936

Corelation: Positively Corelated.

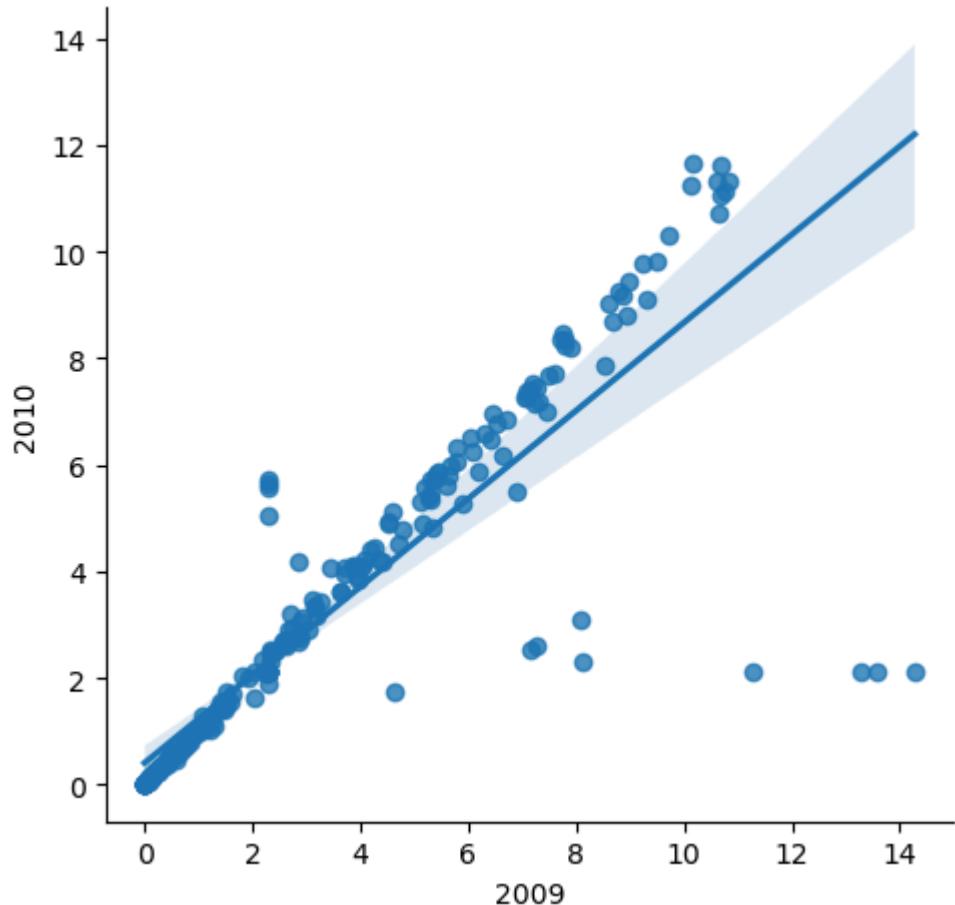
Scaterplot of 2008 vs 2019



Corelation between 2008 and 2019 : 0.8908495351317112

Corelation: Positively Corelated.

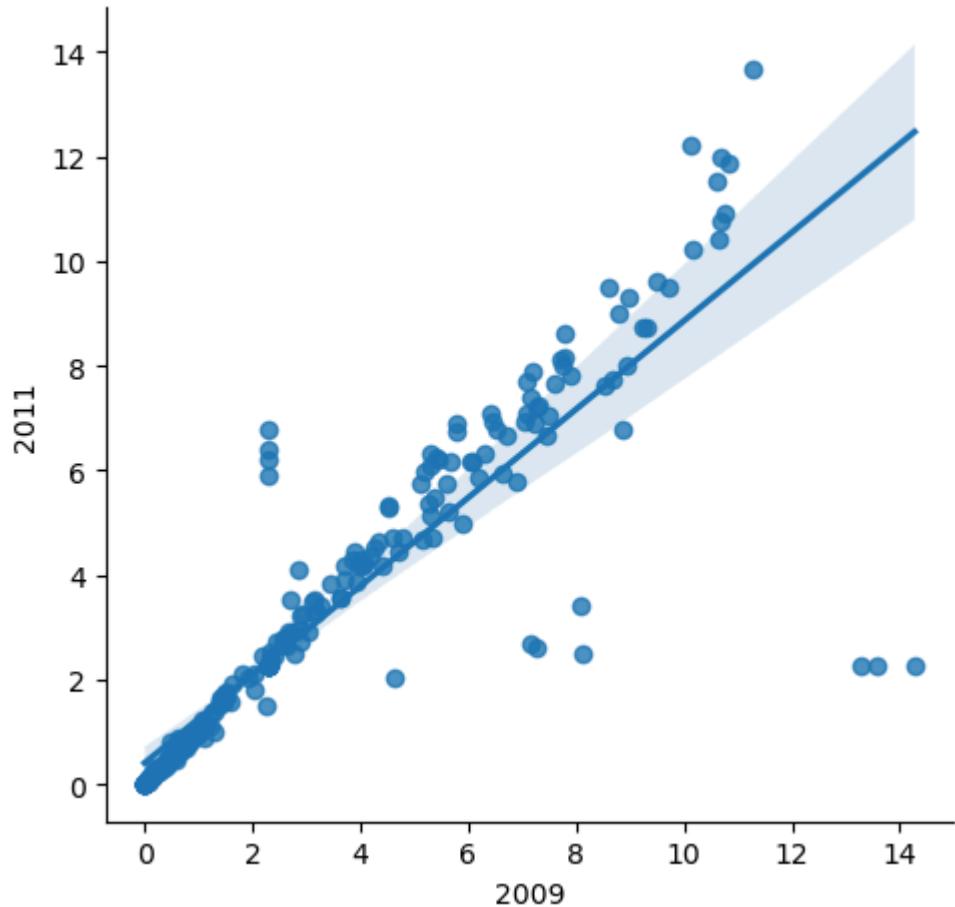
Scaterplot of 2009 vs 2010



Corelation between 2009 and 2010 : 0.8760990774561198

Corelation: Positively Corelated.

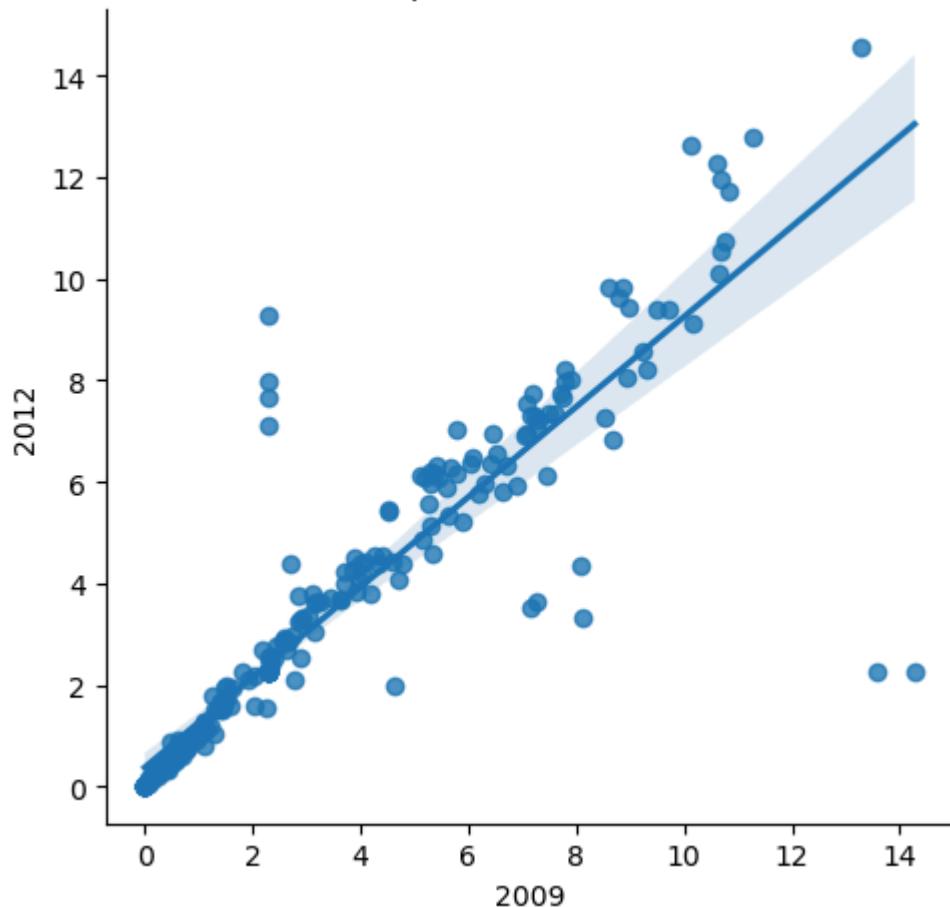
Scaterplot of 2009 vs 2011



Corelation between 2009 and 2011 : 0.8865527540000605

Corelation: Positively Corelated.

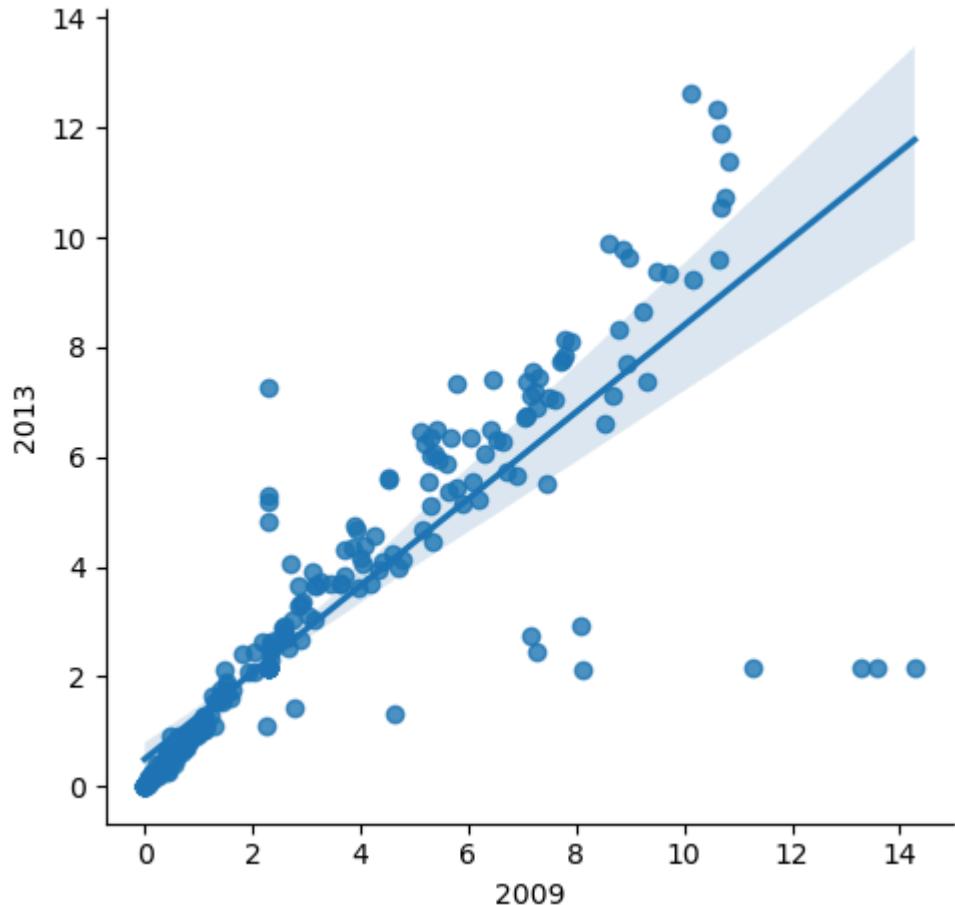
Scaterplot of 2009 vs 2012



Corelation between 2009 and 2012 : 0.9025293392683043

Corelation: Positively Corelated.

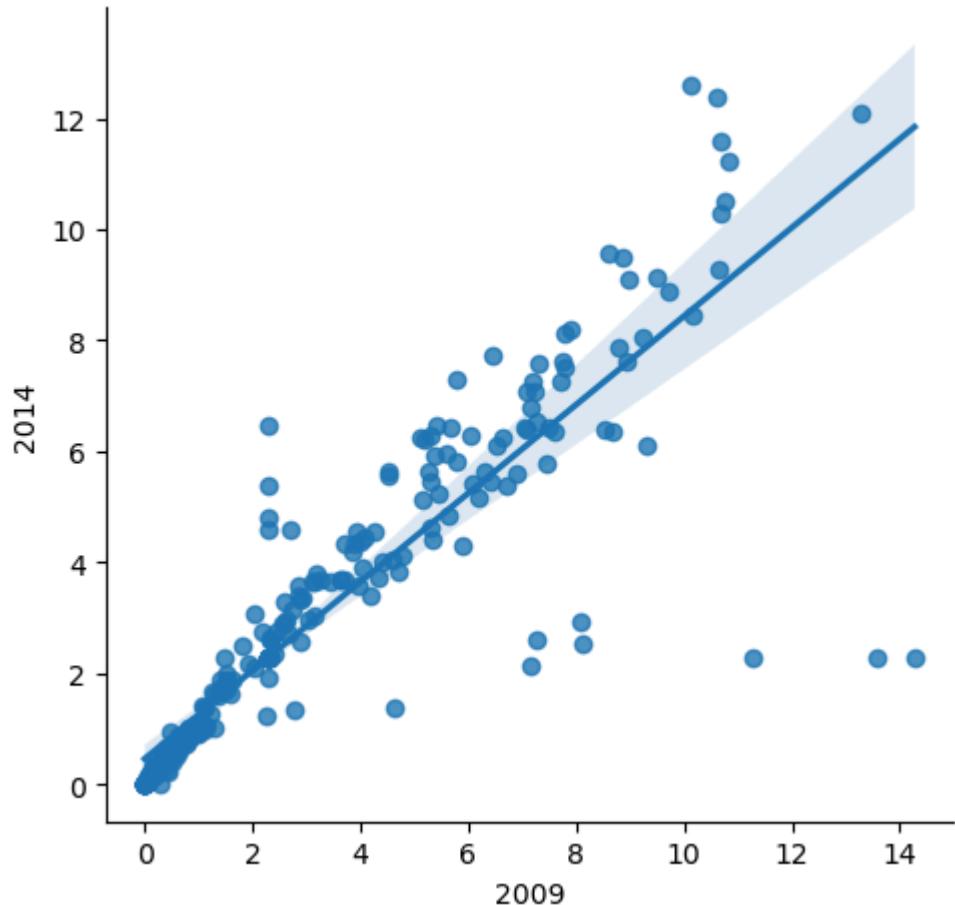
Scaterplot of 2009 vs 2013



Corelation between 2009 and 2013 : 0.8638869323580984

Corelation: Positively Corelated.

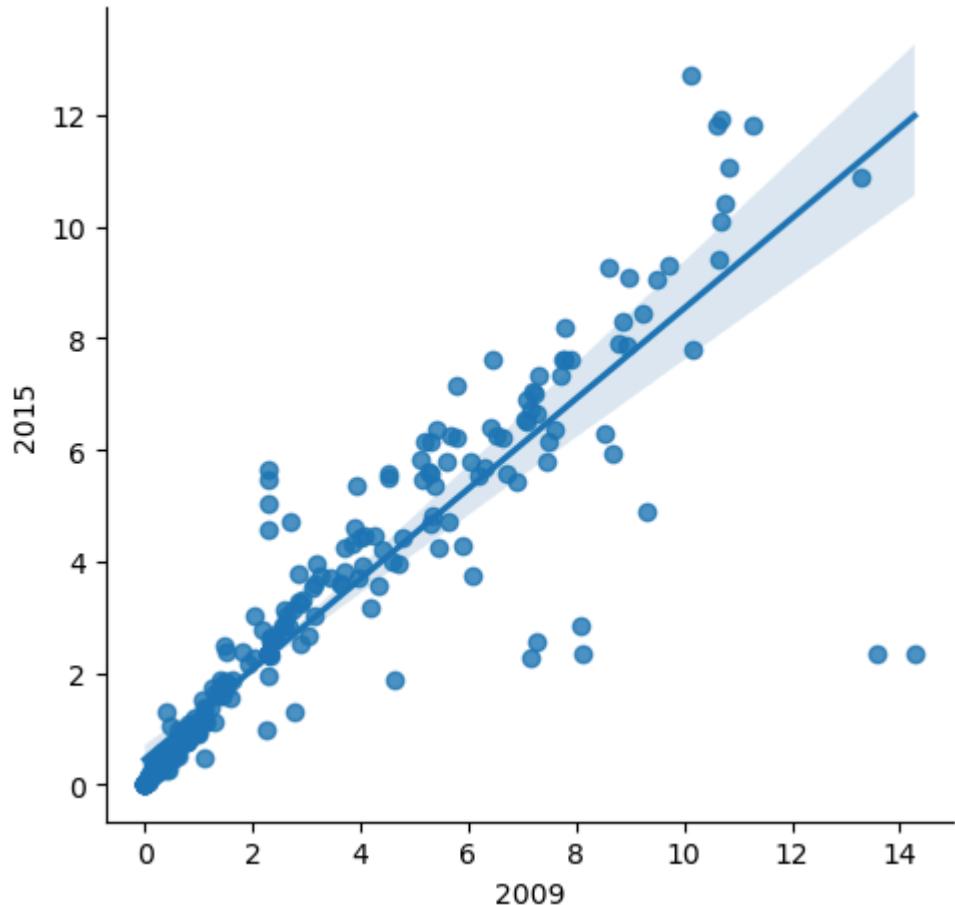
Scaterplot of 2009 vs 2014



Corelation between 2009 and 2014 : 0.8860130597473319

Corelation: Positively Corelated.

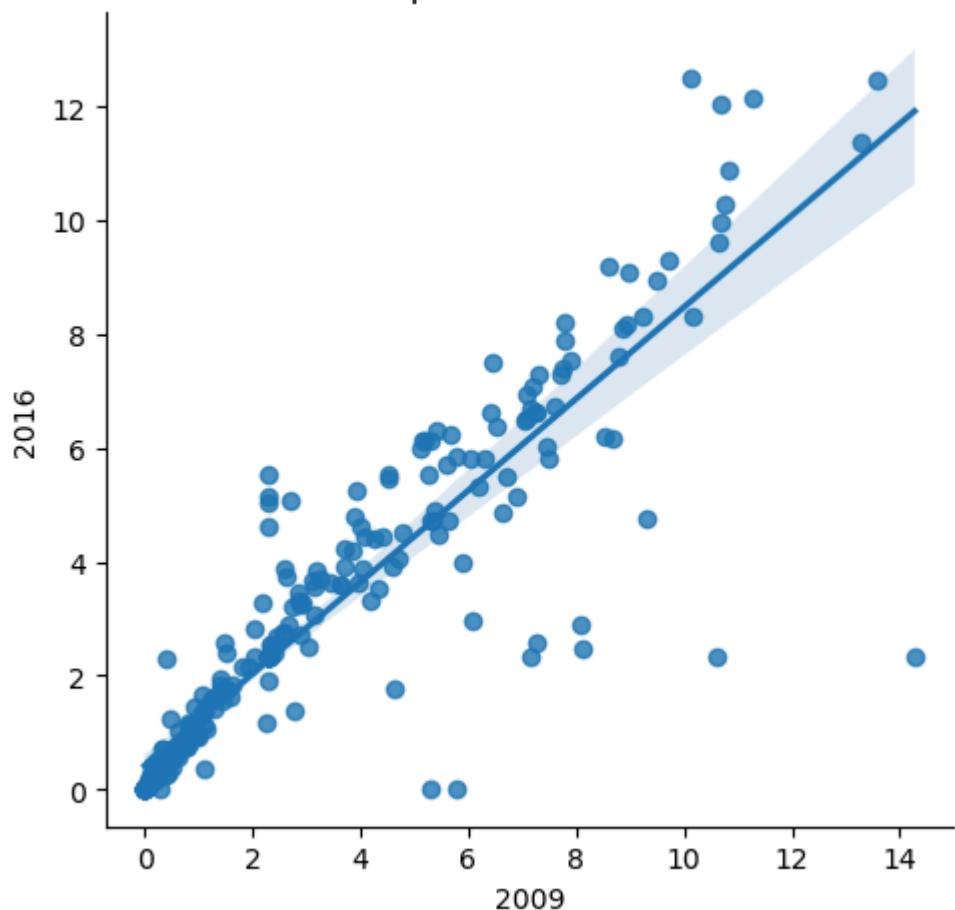
Scaterplot of 2009 vs 2015



Corelation between 2009 and 2015 : 0.8991200889818761

Corelation: Positively Corelated.

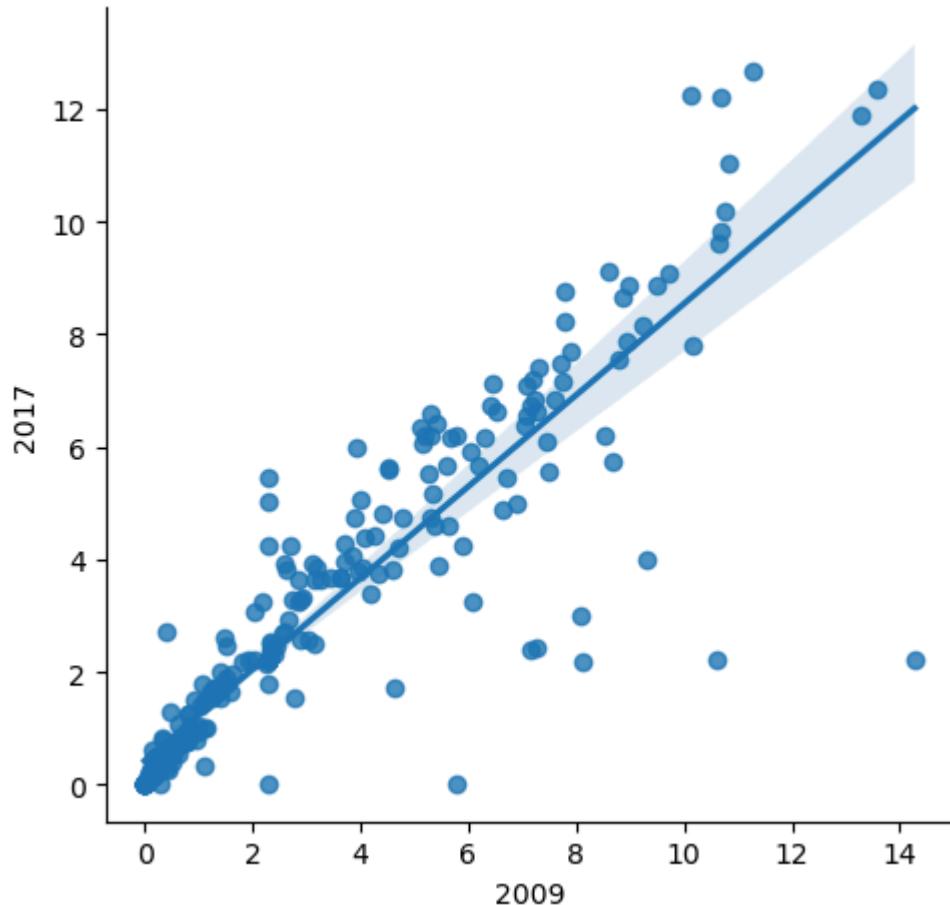
Scaterplot of 2009 vs 2016



Corelation between 2009 and 2016 : 0.8974109057817735

Corelation: Positively Corelated.

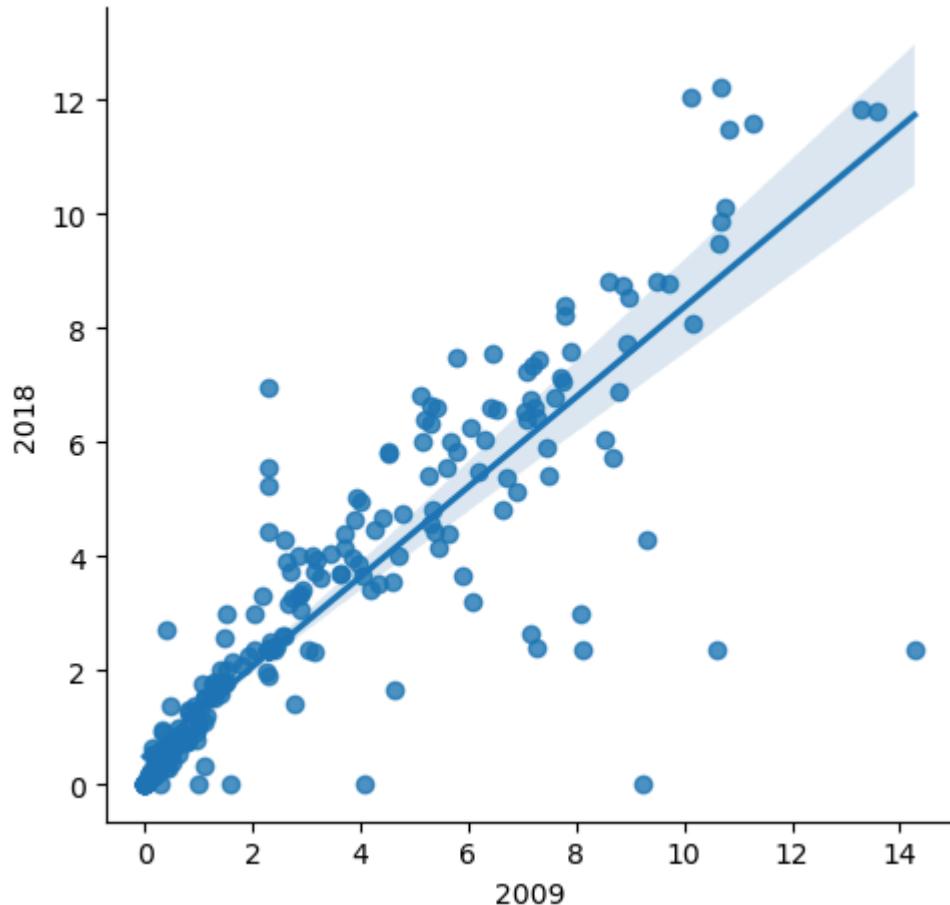
Scaterplot of 2009 vs 2017



Corelation between 2009 and 2017 : 0.8985573063993325

Corelation: Positively Corelated.

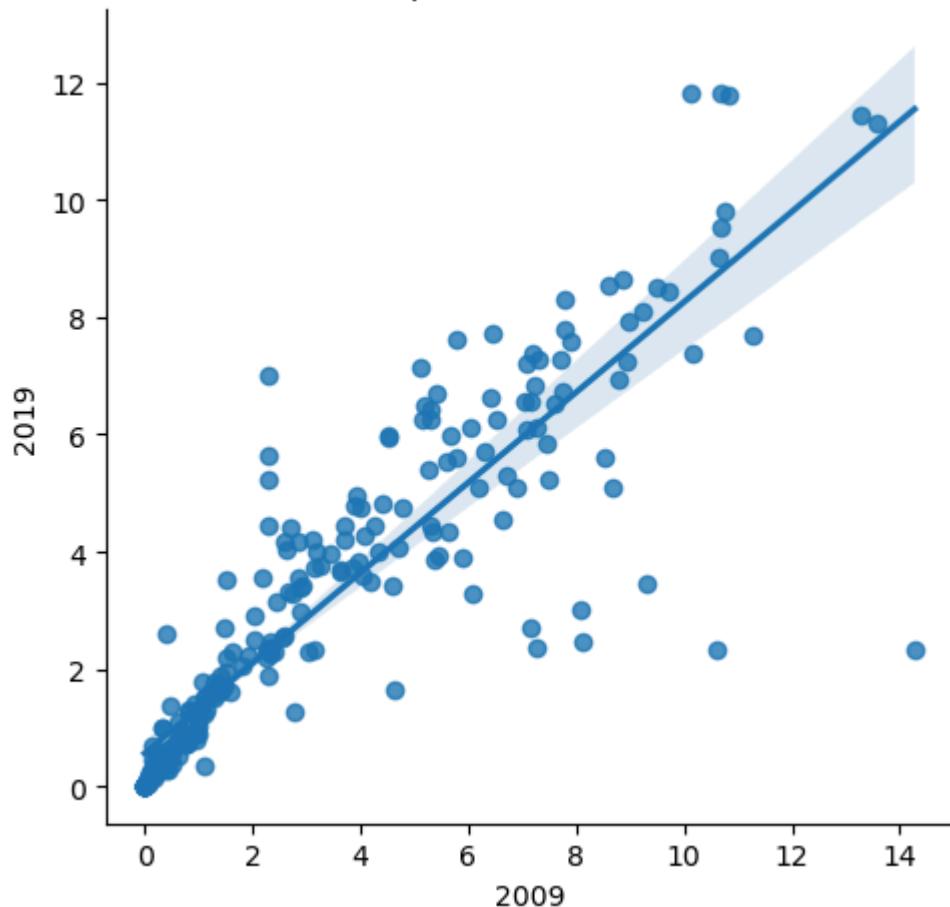
Scaterplot of 2009 vs 2018



Corelation between 2009 and 2018 : 0.8796329274403127

Corelation: Positively Corelated.

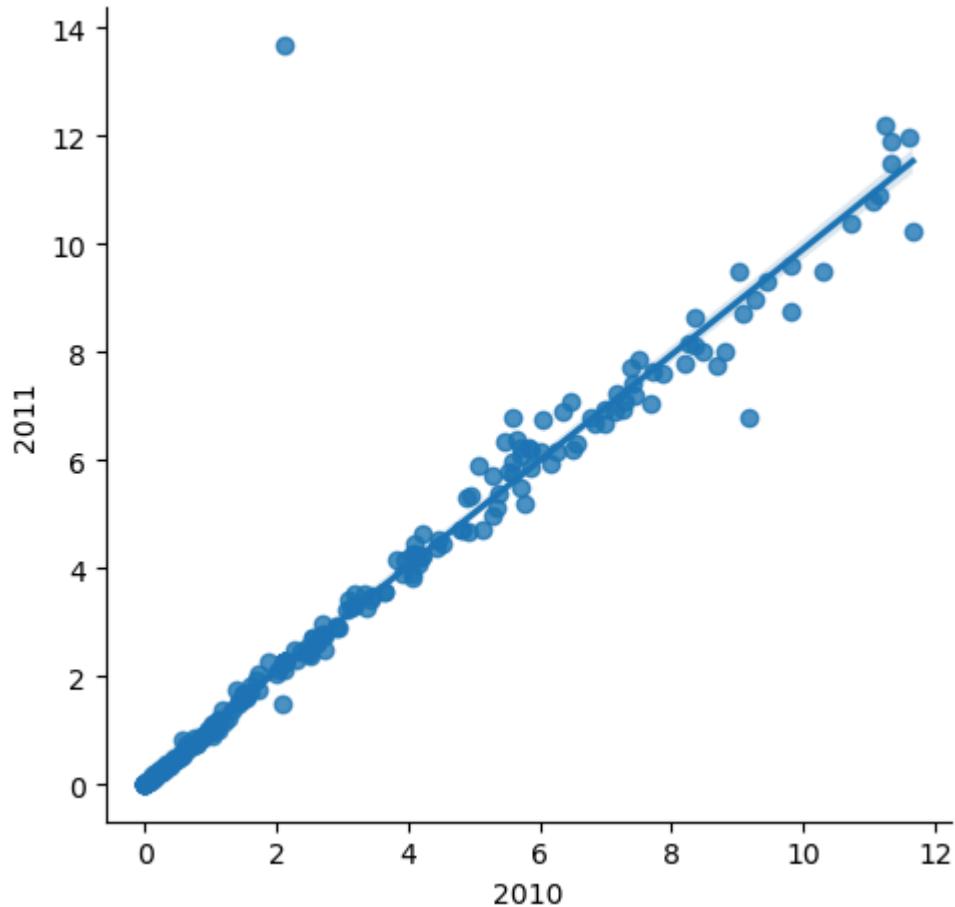
Scaterplot of 2009 vs 2019



Corelation between 2009 and 2019 : 0.8894612243992192

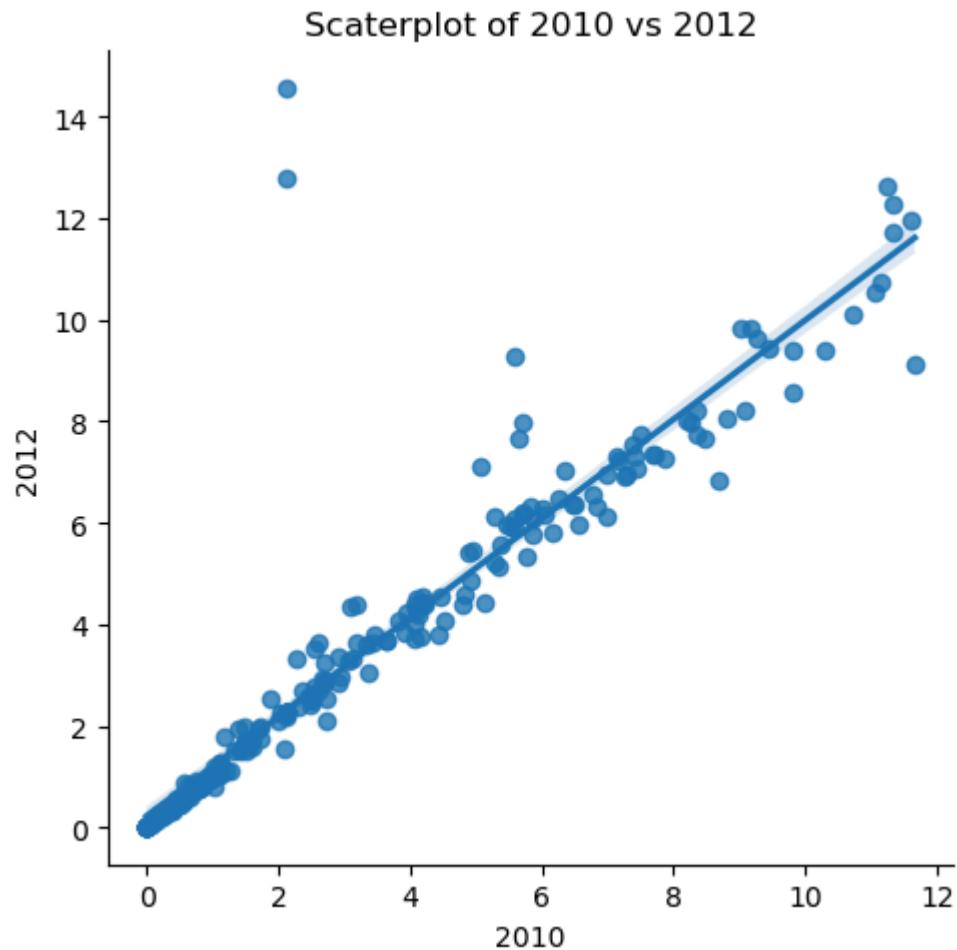
Corelation: Positively Corelated.

Scaterplot of 2010 vs 2011



Corelation between 2010 and 2011 : 0.9683389899424064

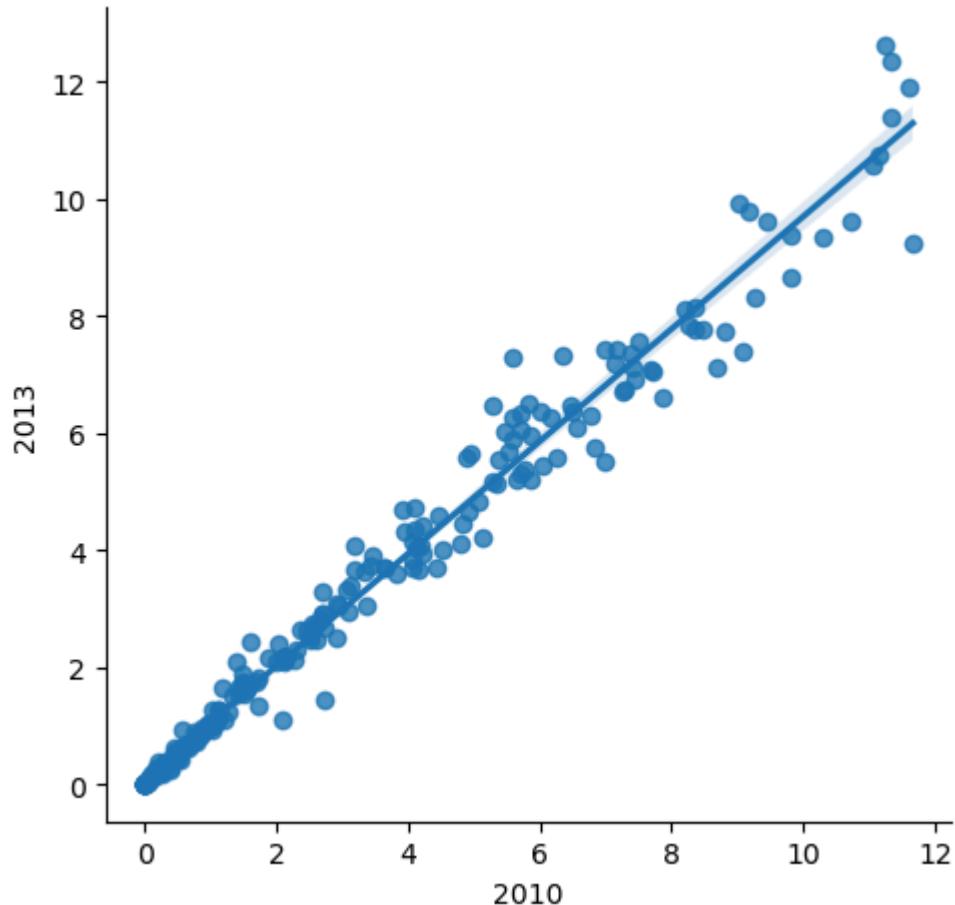
Corelation: Positively Corelated.



Corelation between 2010 and 2012 : 0.9367923622338143

Corelation: Positively Corelated.

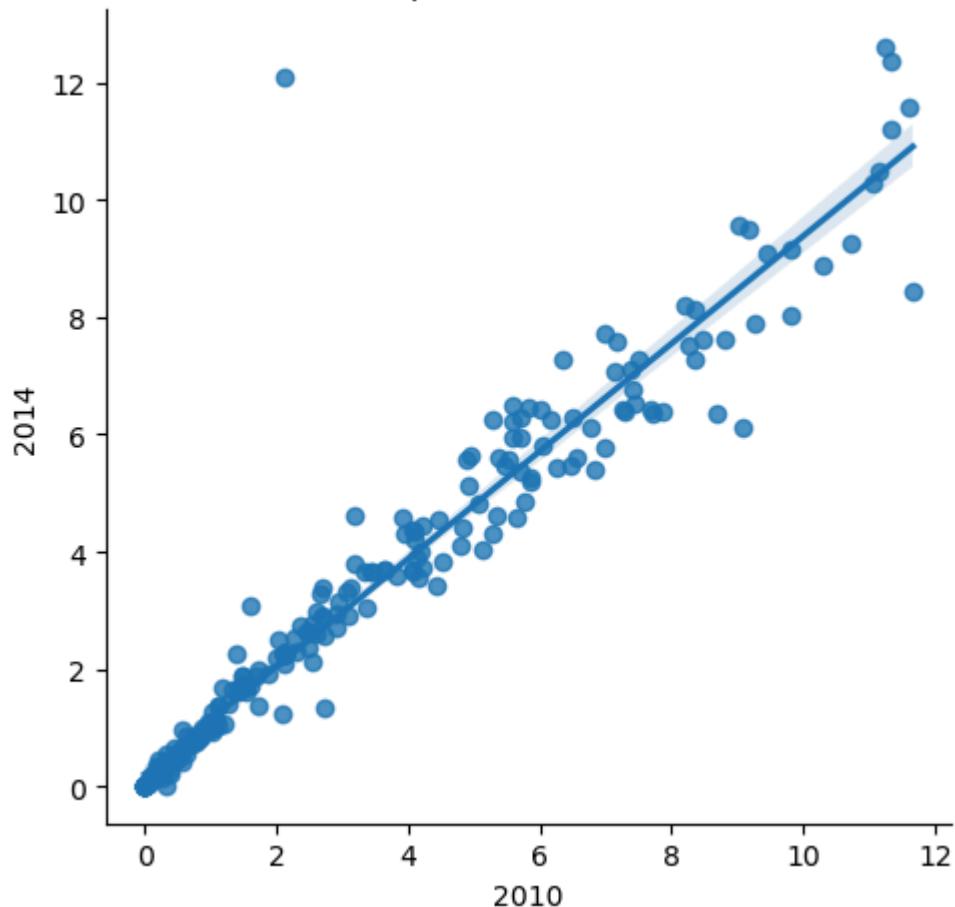
Scaterplot of 2010 vs 2013



Corelation between 2010 and 2013 : 0.9894687553739466

Corelation: Positively Corelated.

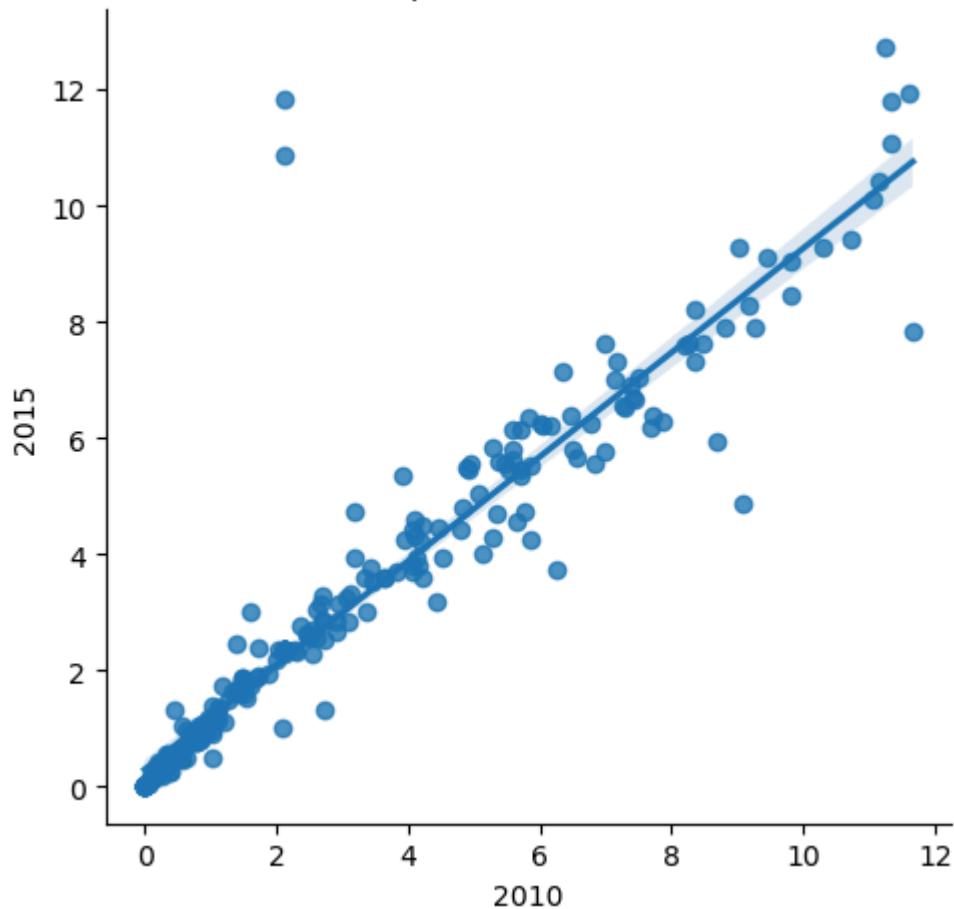
Scaterplot of 2010 vs 2014



Corelation between 2010 and 2014 : 0.9614986911277964

Corelation: Positively Corelated.

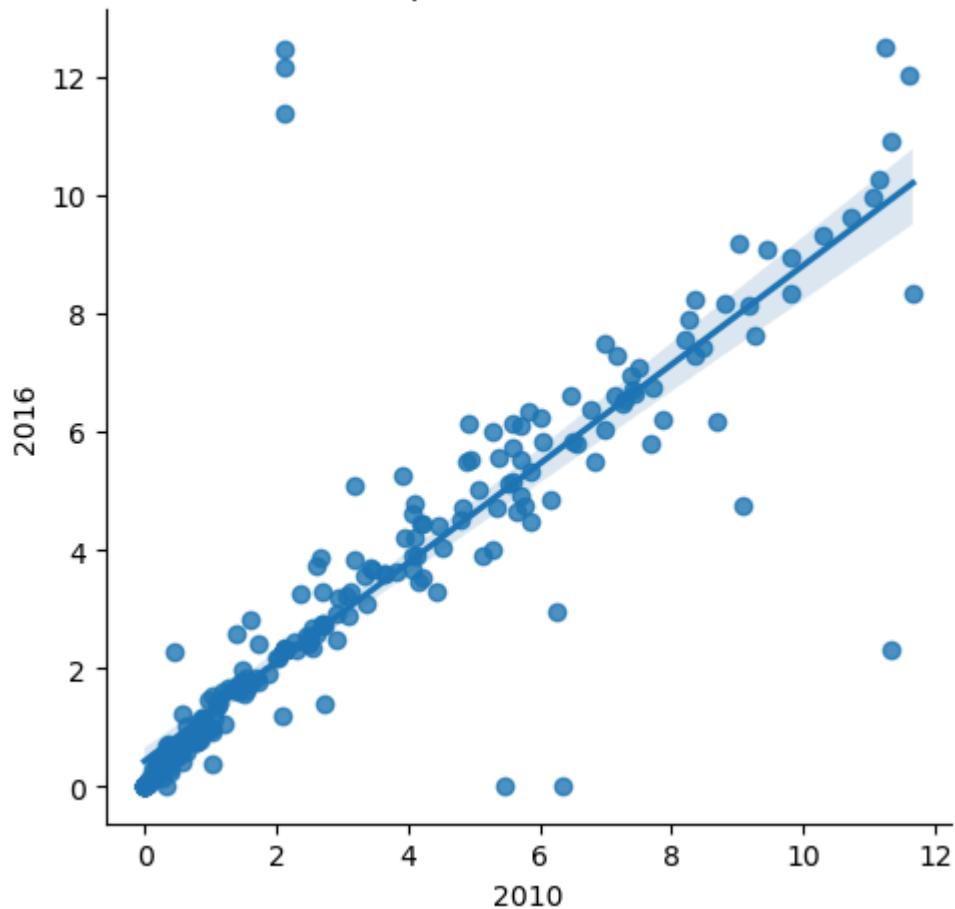
Scaterplot of 2010 vs 2015



Corelation between 2010 and 2015 : 0.9415368277501343

Corelation: Positively Corelated.

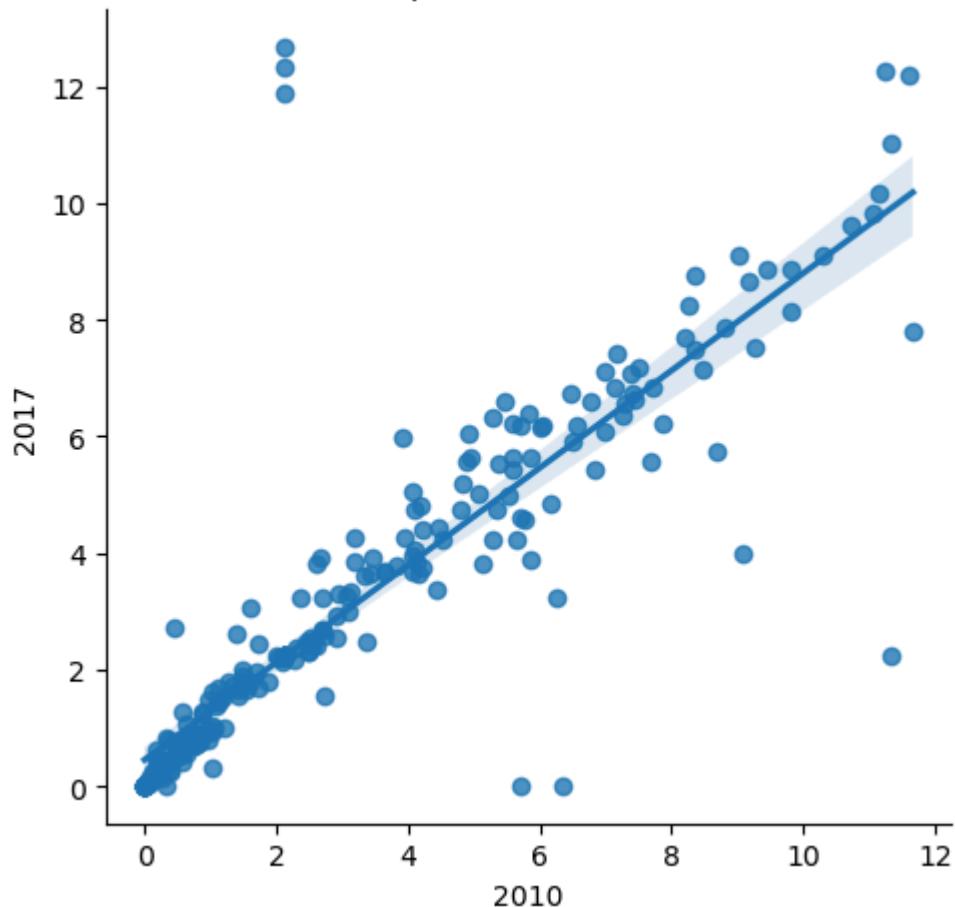
Scaterplot of 2010 vs 2016



Corelation between 2010 and 2016 : 0.880702774724576

Corelation: Positively Corelated.

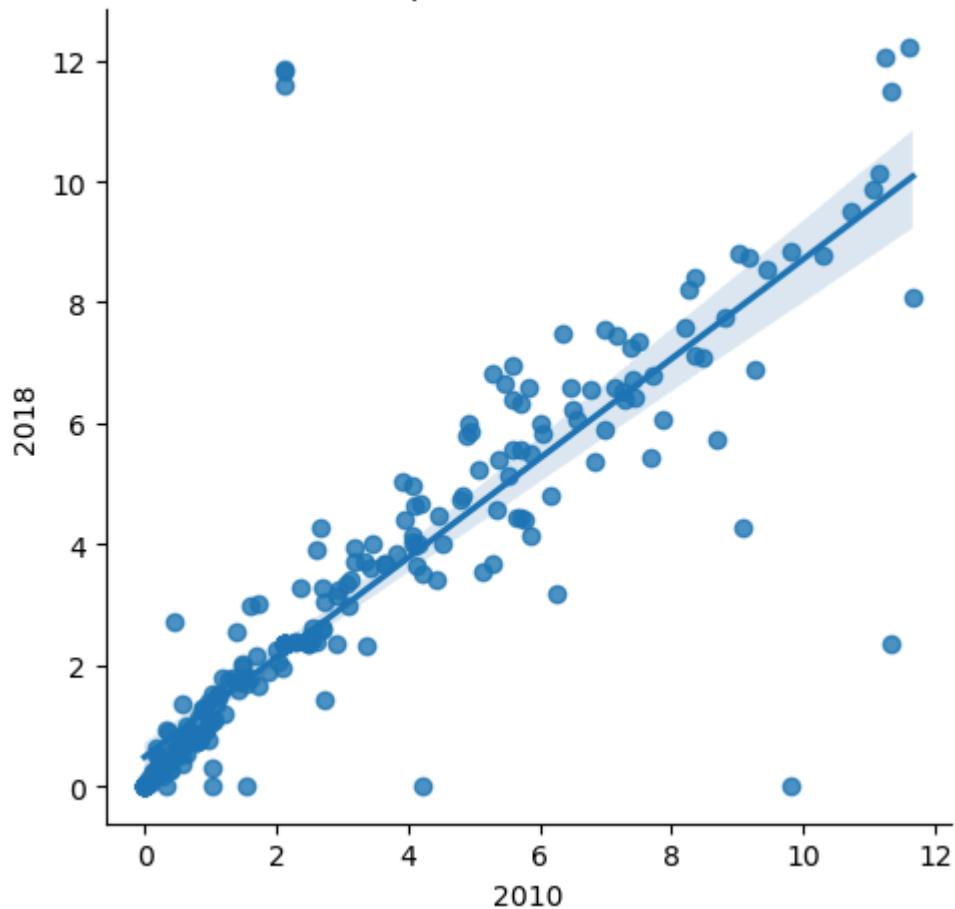
Scaterplot of 2010 vs 2017



Corelation between 2010 and 2017 : 0.8715735386029383

Corelation: Positively Corelated.

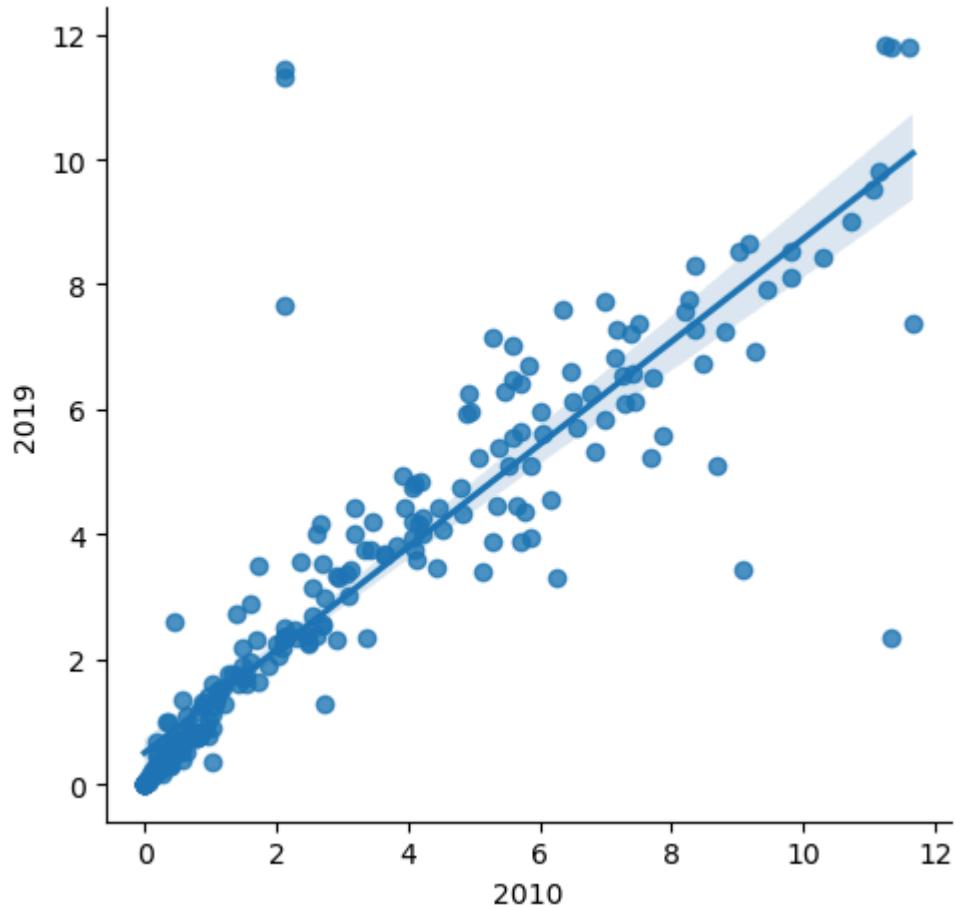
Scaterplot of 2010 vs 2018



Corelation between 2010 and 2018 : 0.867134992391157

Corelation: Positively Corelated.

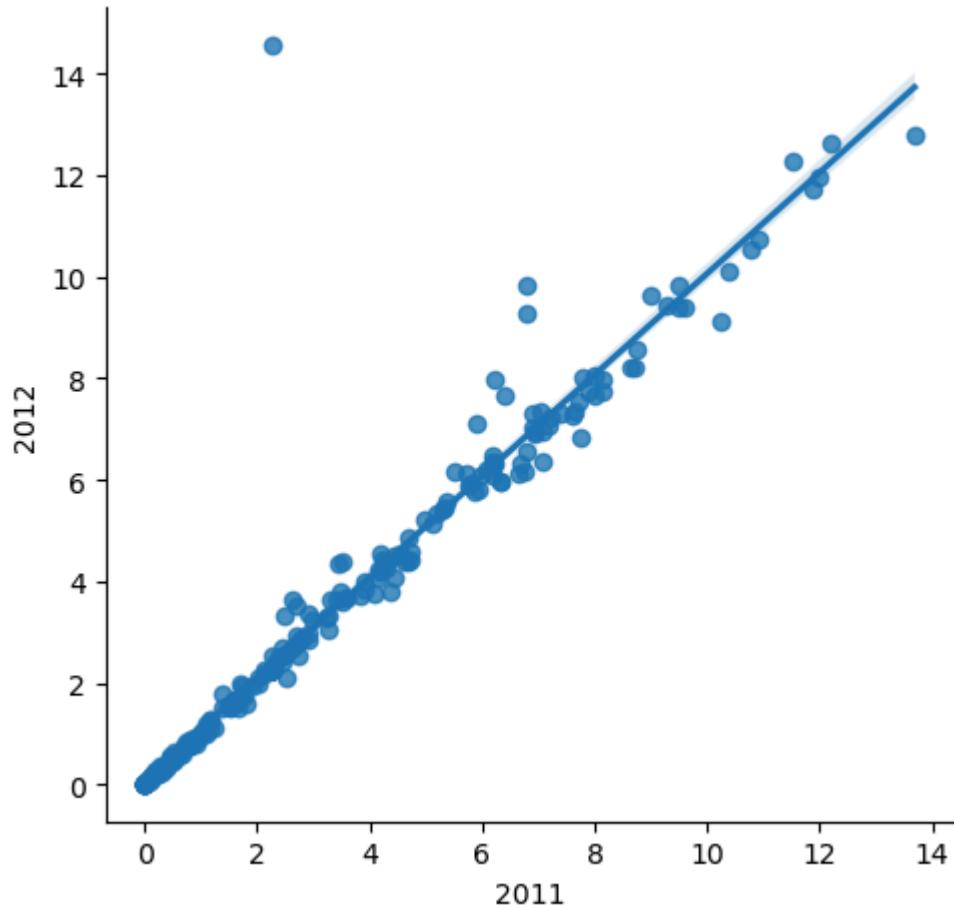
Scaterplot of 2010 vs 2019



Corelation between 2010 and 2019 : 0.897288390751421

Corelation: Positively Corelated.

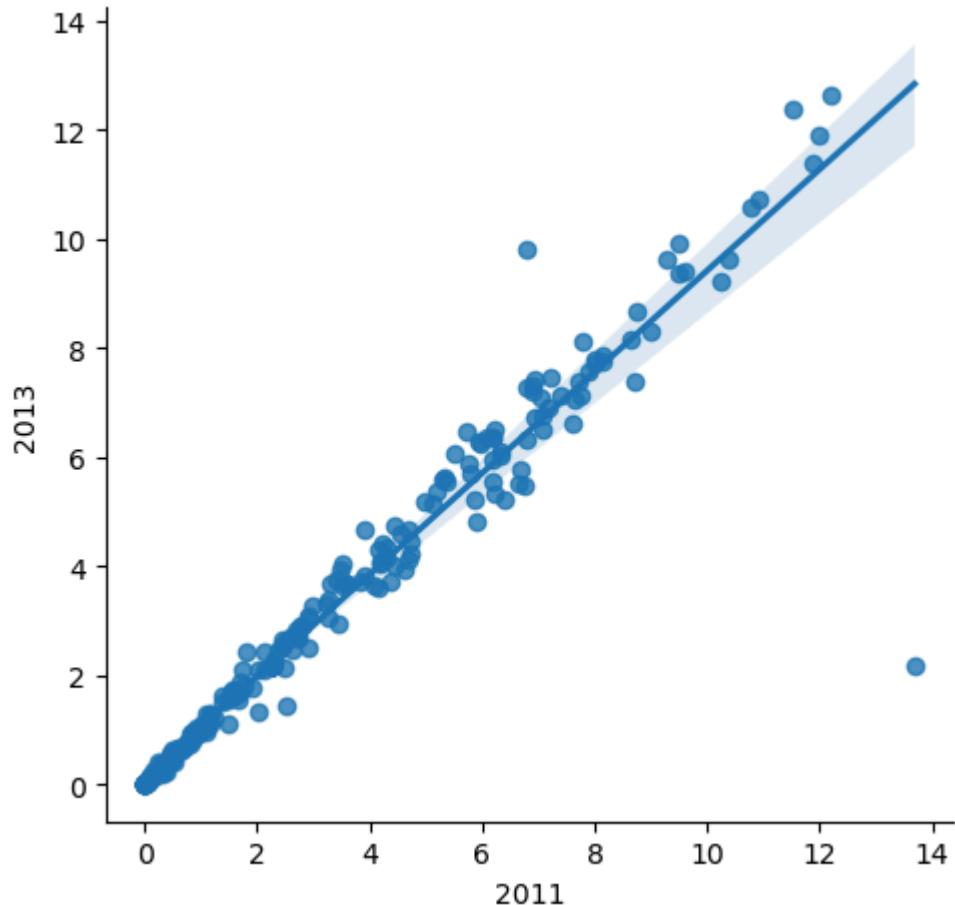
Scaterplot of 2011 vs 2012



Corelation between 2011 and 2012 : 0.9646303628812372

Corelation: Positively Corelated.

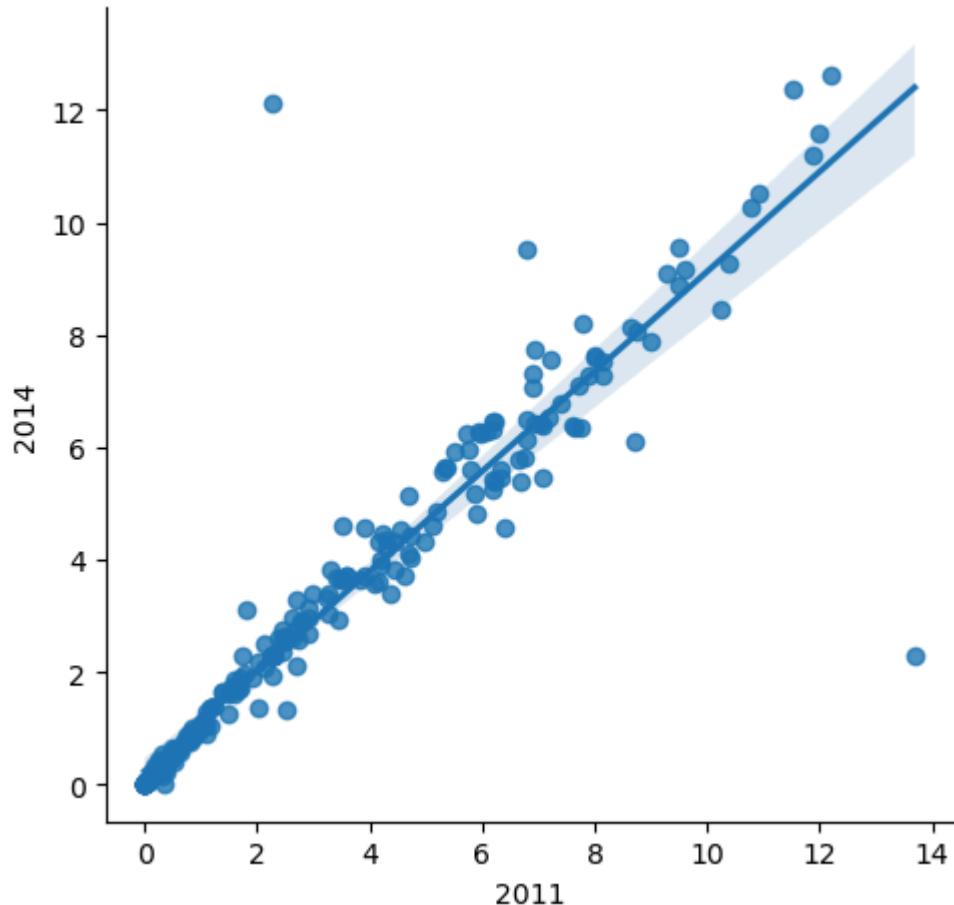
Scaterplot of 2011 vs 2013



Corelation between 2011 and 2013 : 0.9661174325247627

Corelation: Positively Corelated.

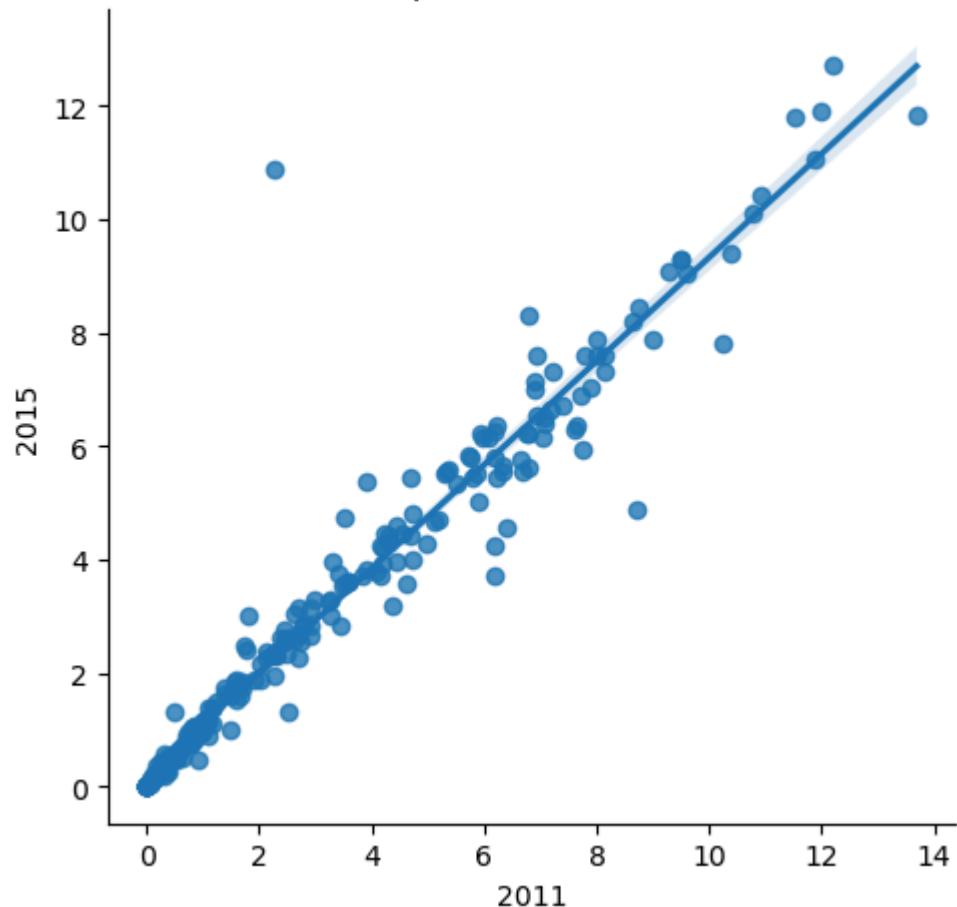
Scaterplot of 2011 vs 2014



Corelation between 2011 and 2014 : 0.9408936496771823

Corelation: Positively Corelated.

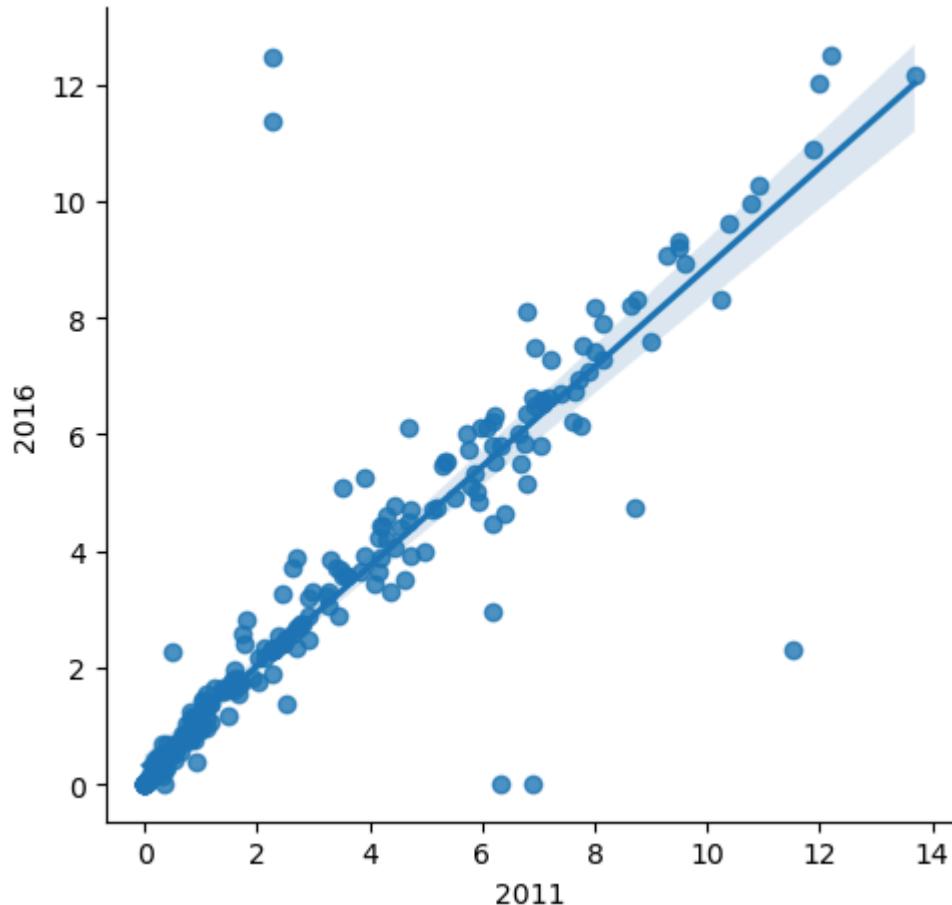
Scaterplot of 2011 vs 2015



Corelation between 2011 and 2015 : 0.9692184004373914

Corelation: Positively Corelated.

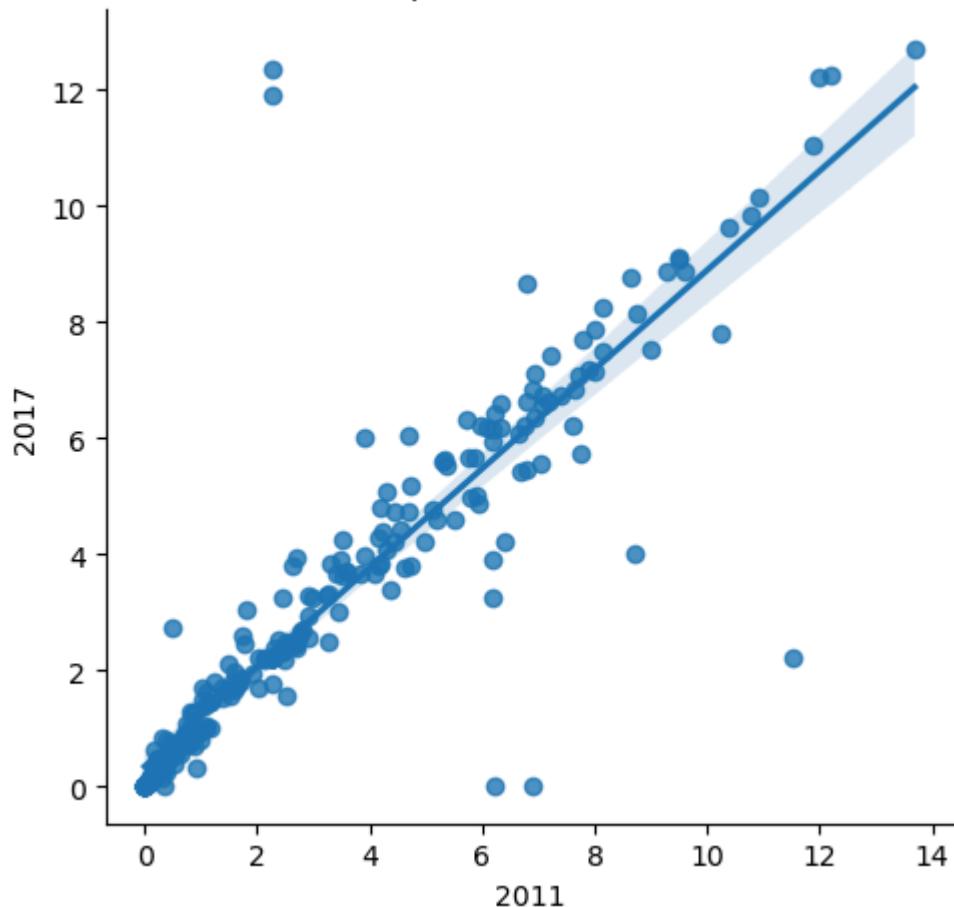
Scaterplot of 2011 vs 2016



Corelation between 2011 and 2016 : 0.9069217540965466

Corelation: Positively Corelated.

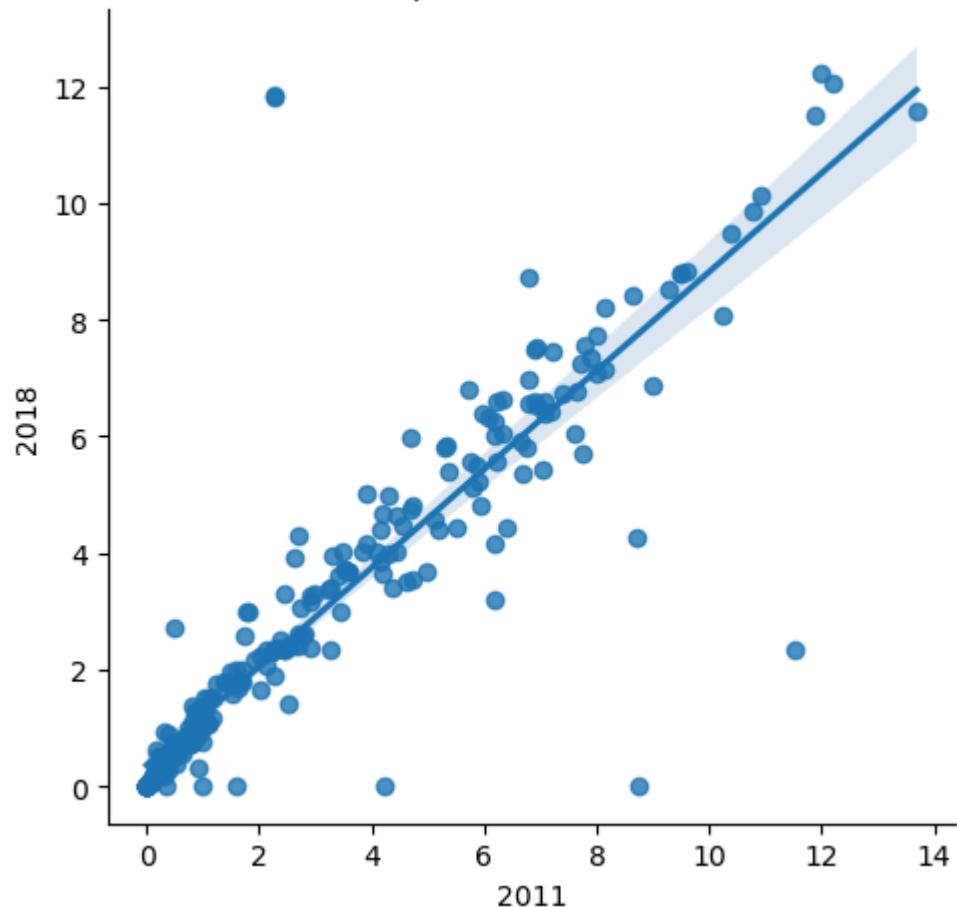
Scaterplot of 2011 vs 2017



Corelation between 2011 and 2017 : 0.9016299064699277

Corelation: Positively Corelated.

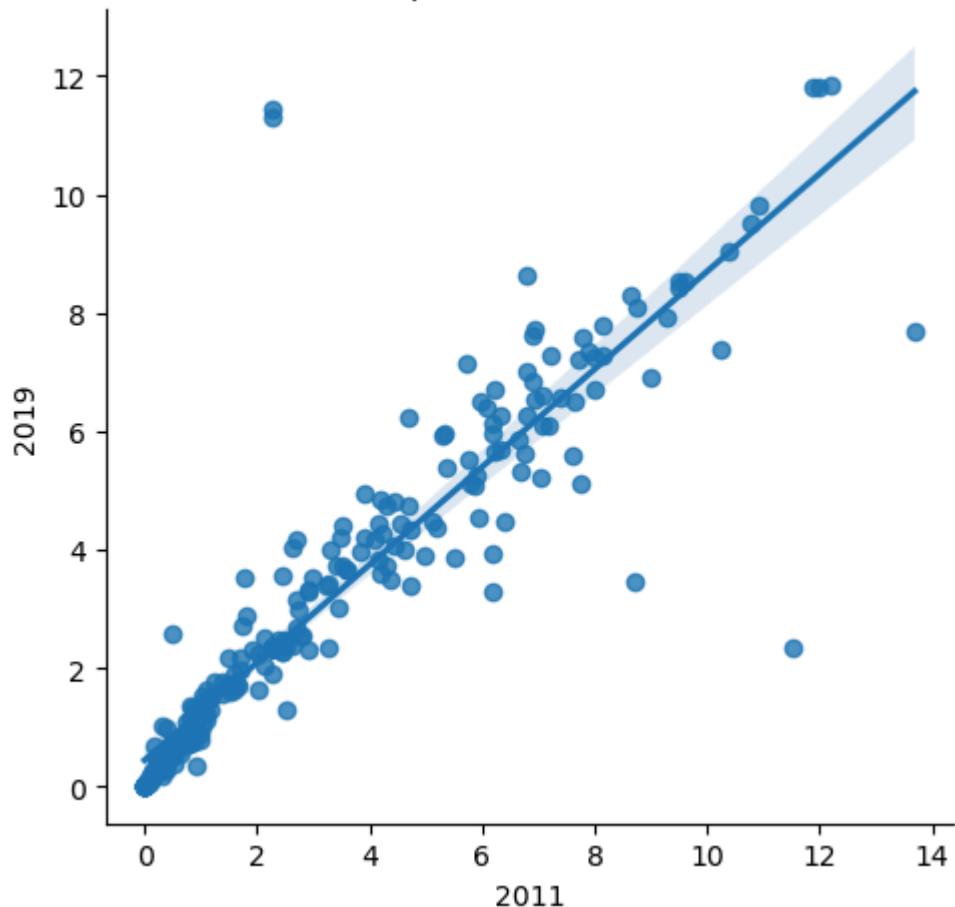
Scaterplot of 2011 vs 2018



Corelation between 2011 and 2018 : 0.900363418509589

Corelation: Positively Corelated.

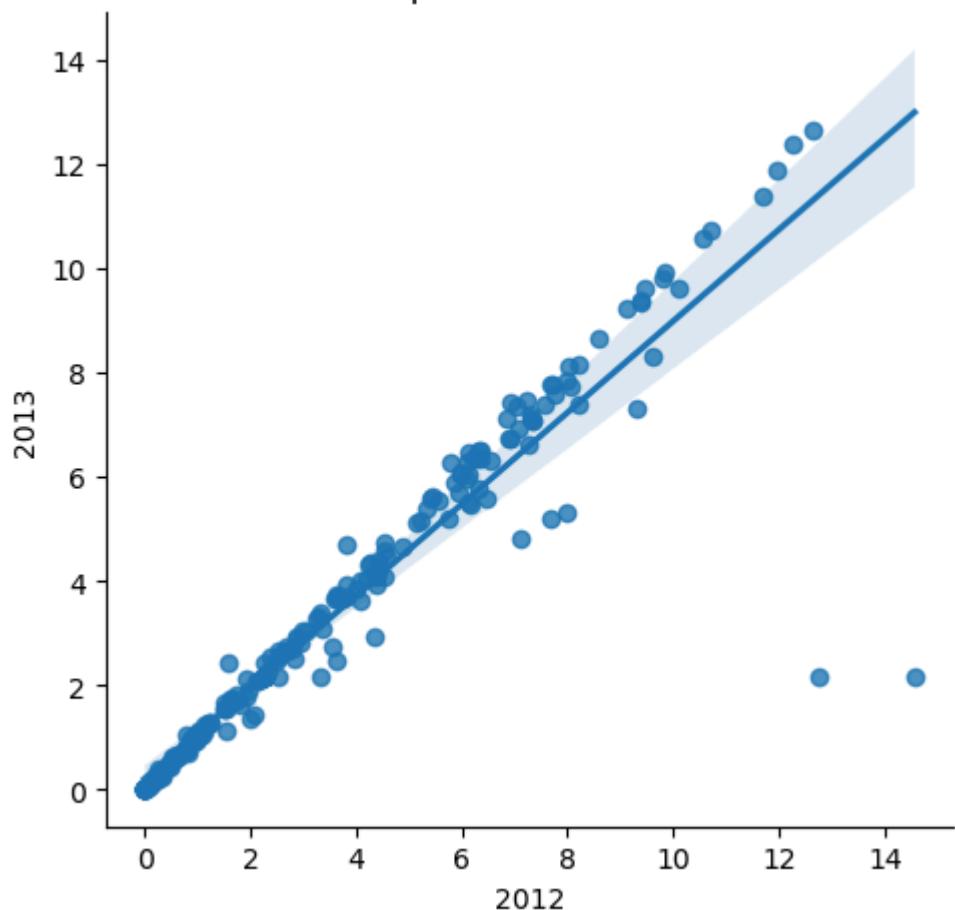
Scaterplot of 2011 vs 2019



Corelation between 2011 and 2019 : 0.9098061566607546

Corelation: Positively Corelated.

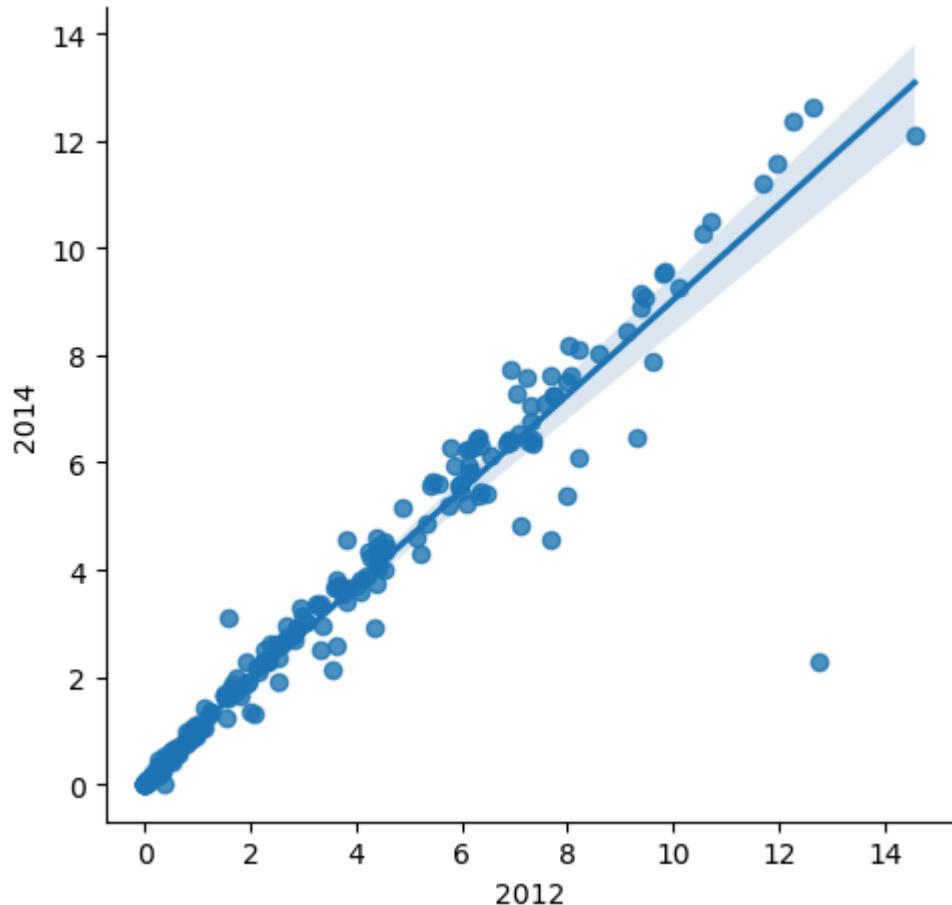
Scaterplot of 2012 vs 2013



Corelation between 2012 and 2013 : 0.9428102138261828

Corelation: Positively Corelated.

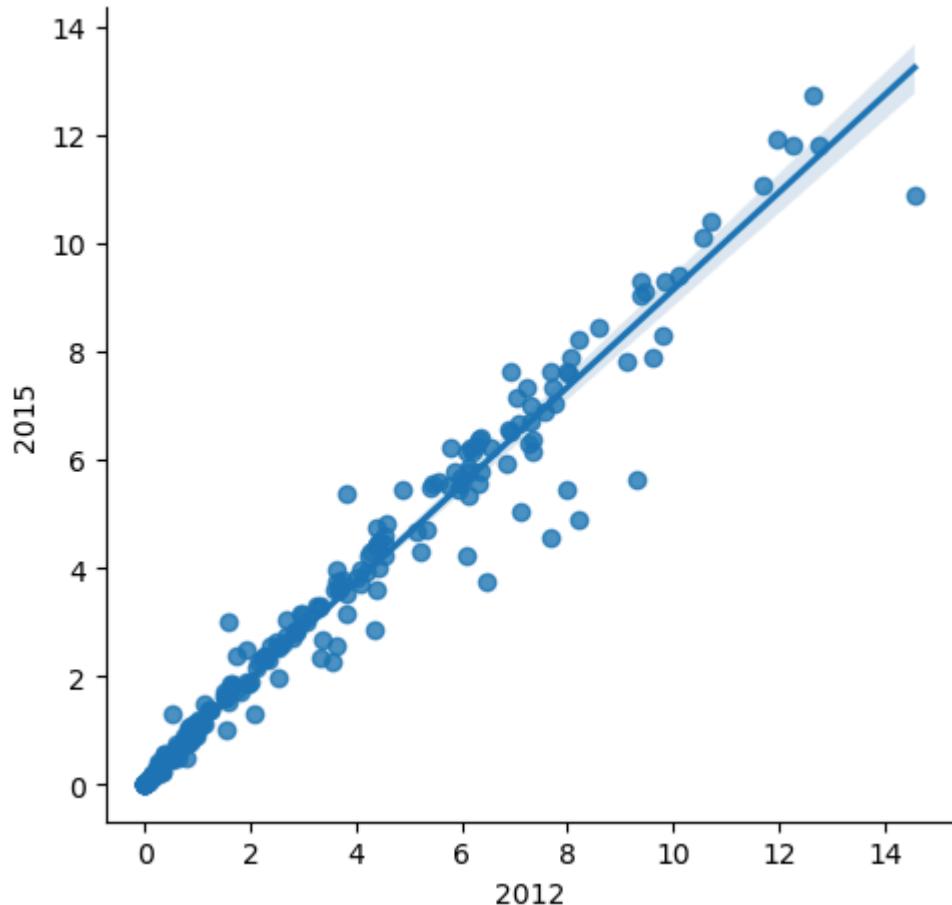
Scaterplot of 2012 vs 2014



Corelation between 2012 and 2014 : 0.9687169224428966

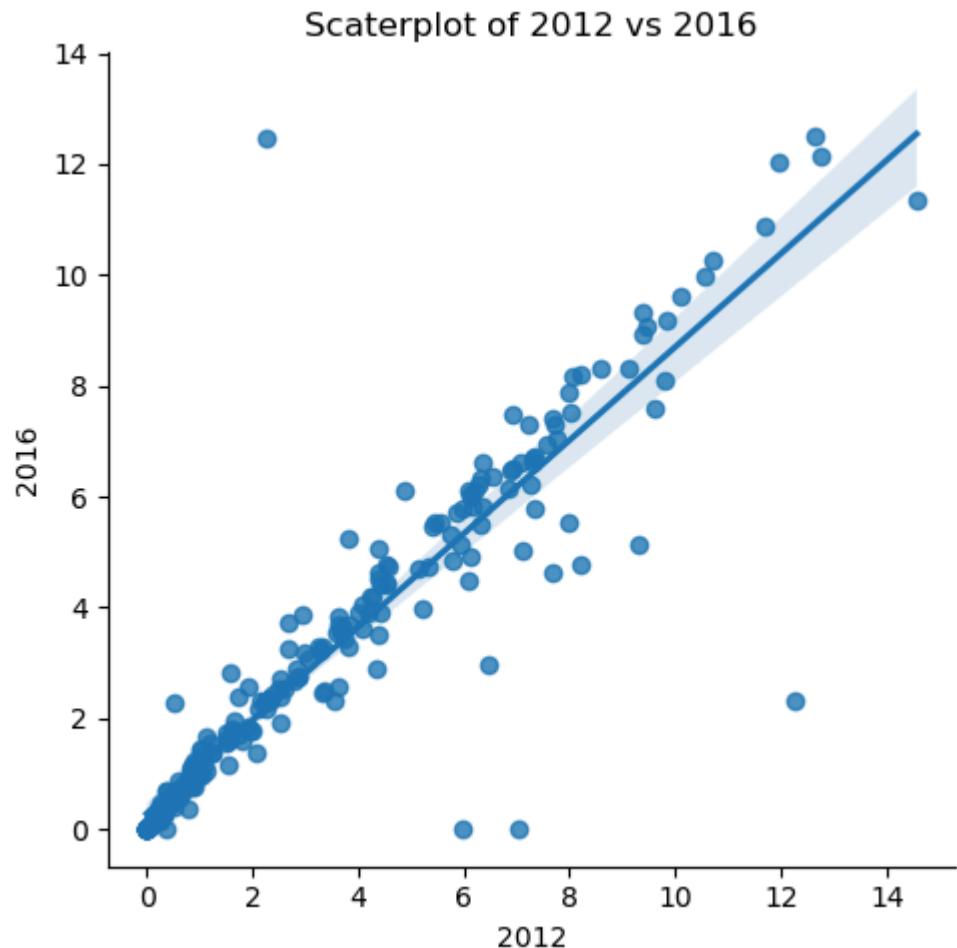
Corelation: Positively Corelated.

Scaterplot of 2012 vs 2015



Corelation between 2012 and 2015 : 0.9834704934894182

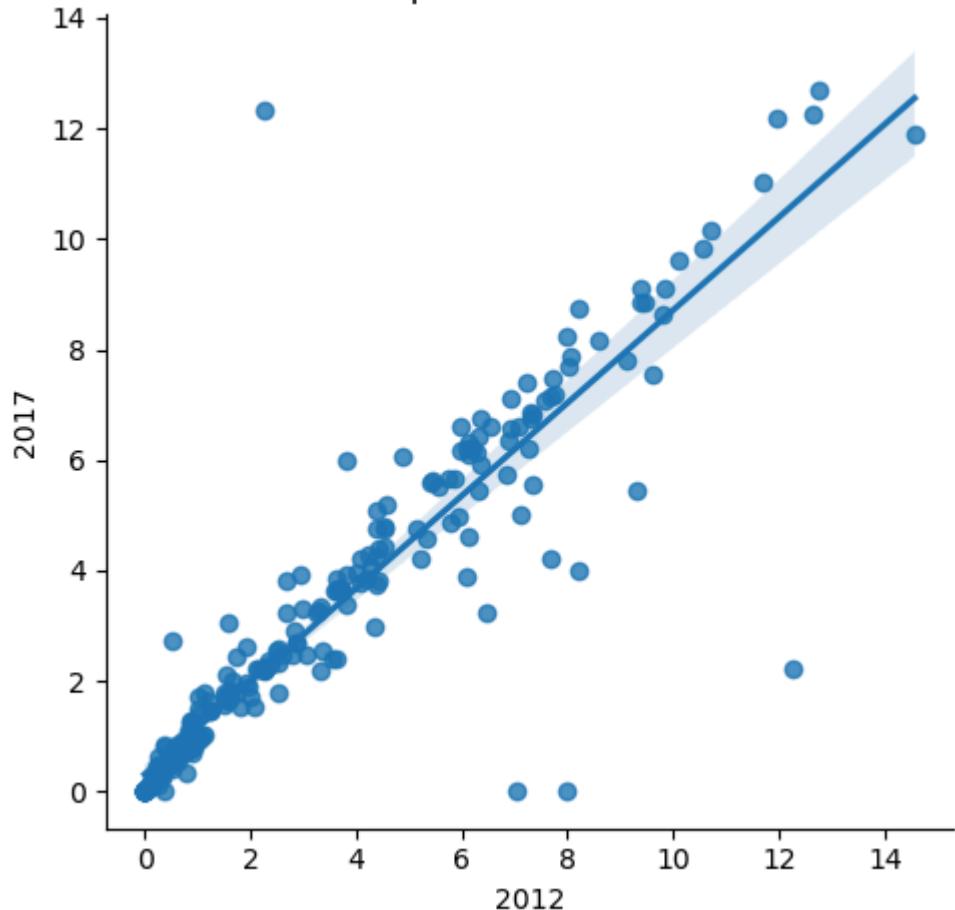
Corelation: Positively Corelated.



Corelation between 2012 and 2016 : 0.9224154070702899

Corelation: Positively Corelated.

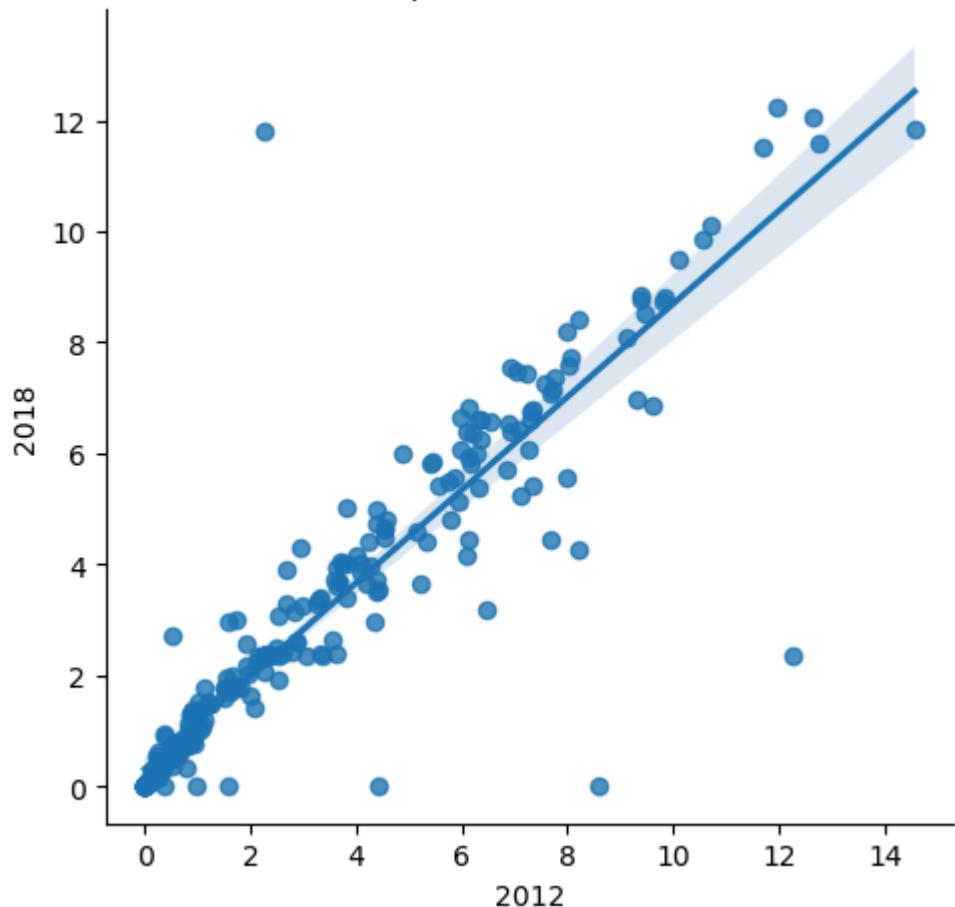
Scaterplot of 2012 vs 2017



Corelation between 2012 and 2017 : 0.9148540315227965

Corelation: Positively Corelated.

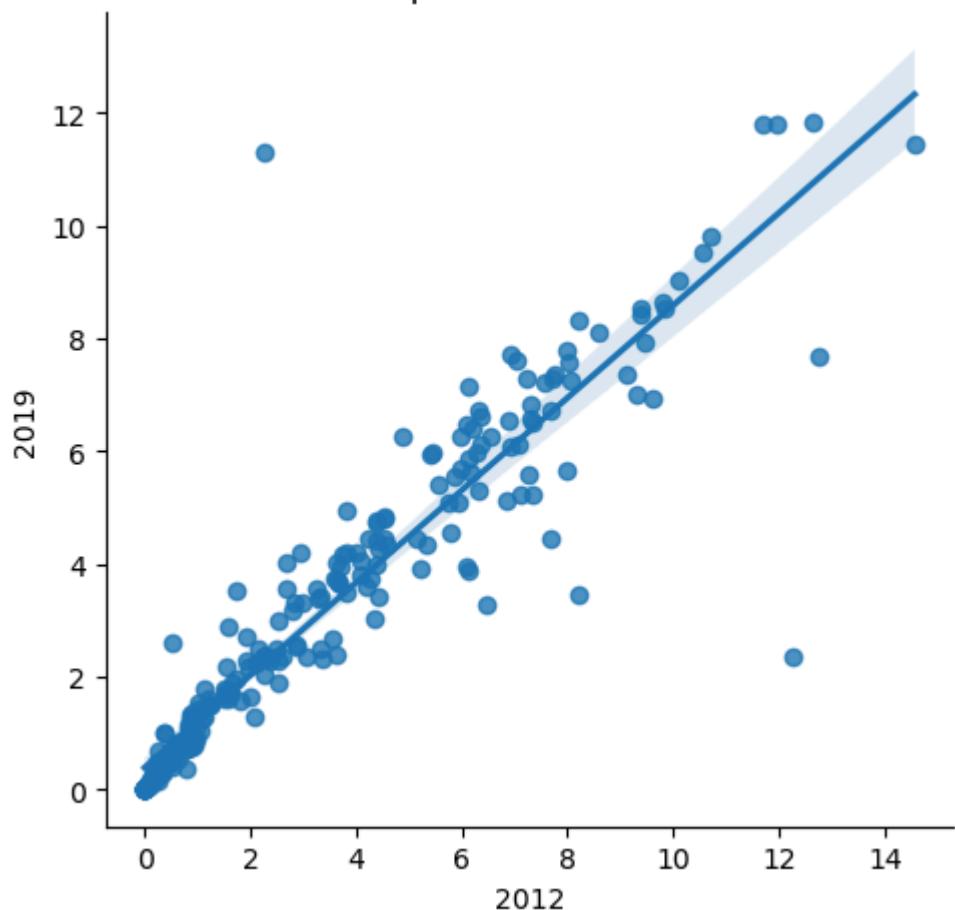
Scaterplot of 2012 vs 2018



Corelation between 2012 and 2018 : 0.9207528168299393

Corelation: Positively Corelated.

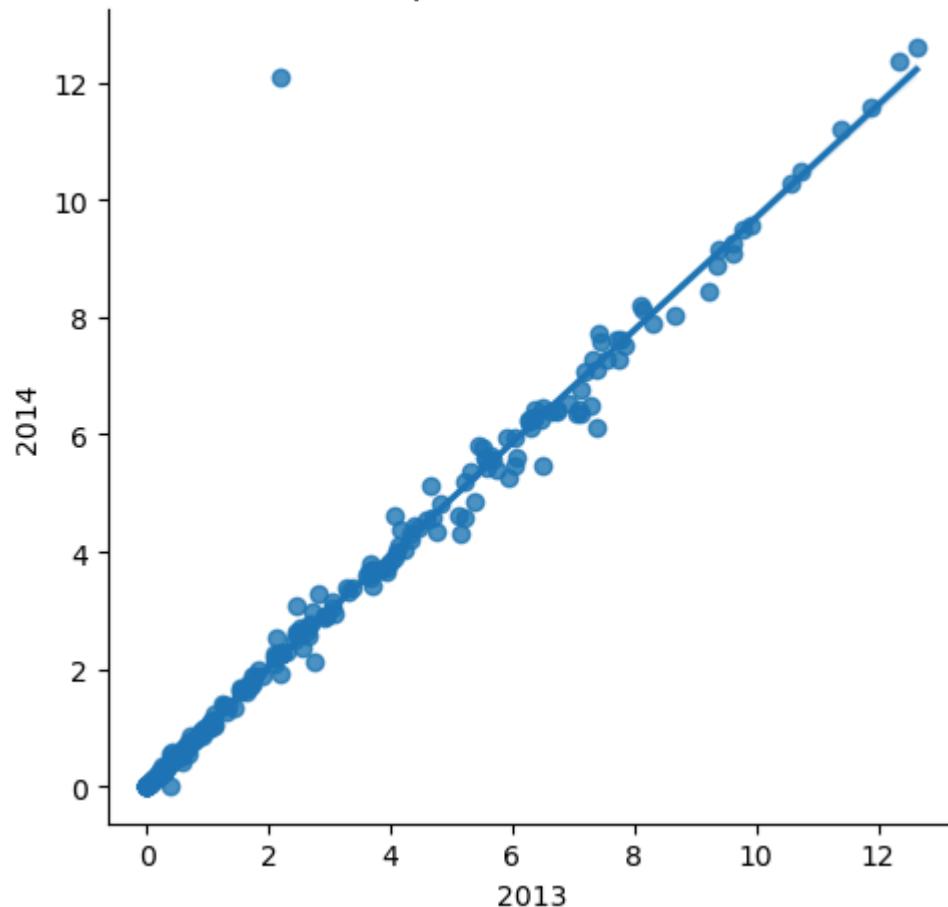
Scaterplot of 2012 vs 2019



Corelation between 2012 and 2019 : 0.9323502551065233

Corelation: Positively Corelated.

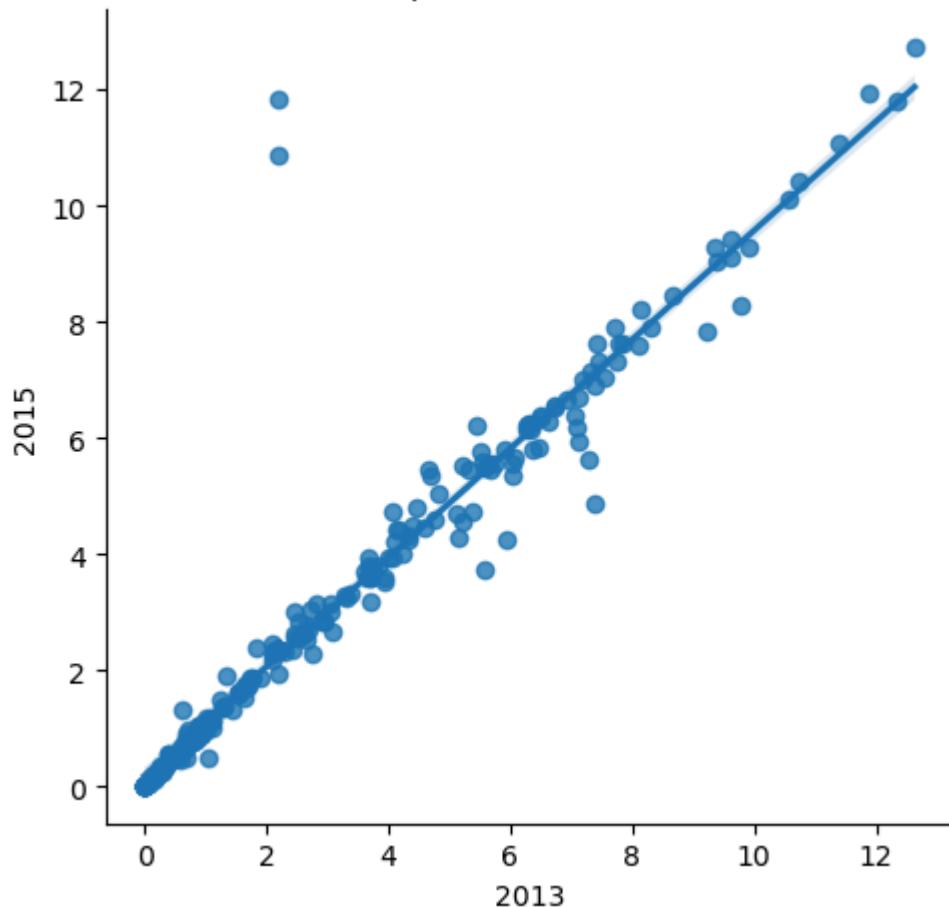
Scaterplot of 2013 vs 2014



Corelation between 2013 and 2014 : 0.9752496189205476

Corelation: Positively Corelated.

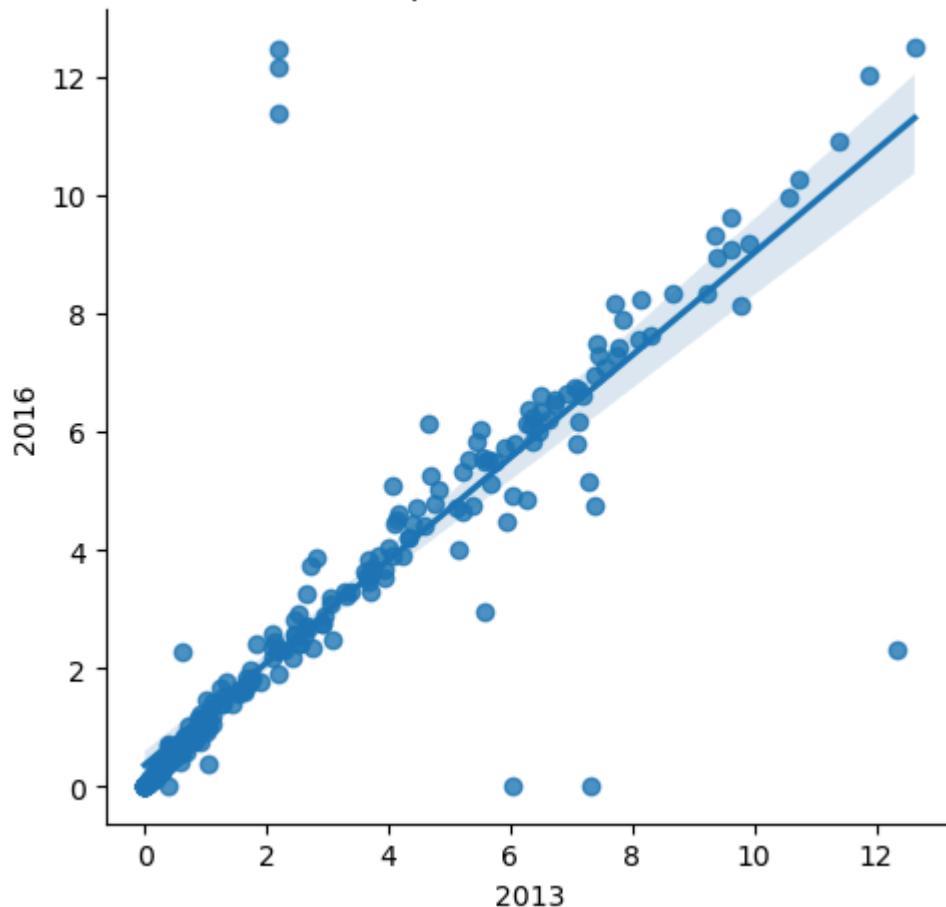
Scaterplot of 2013 vs 2015



Corelation between 2013 and 2015 : 0.955049106512137

Corelation: Positively Corelated.

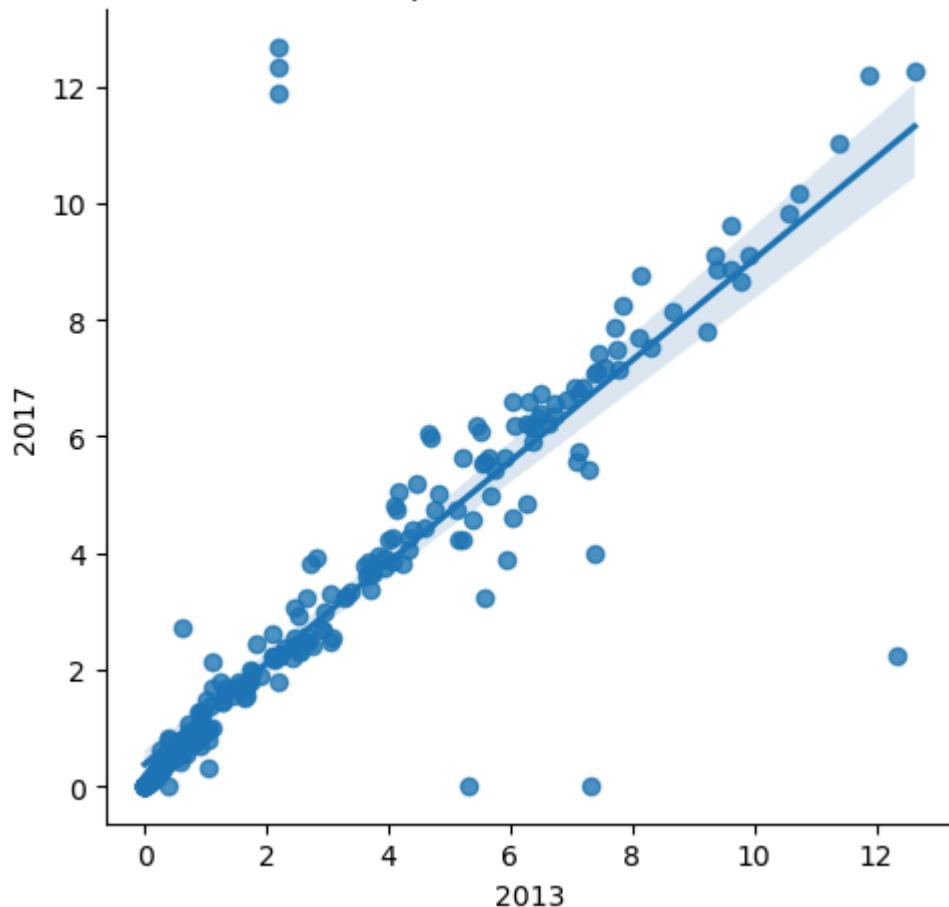
Scaterplot of 2013 vs 2016



Corelation between 2013 and 2016 : 0.8827031766556814

Corelation: Positively Corelated.

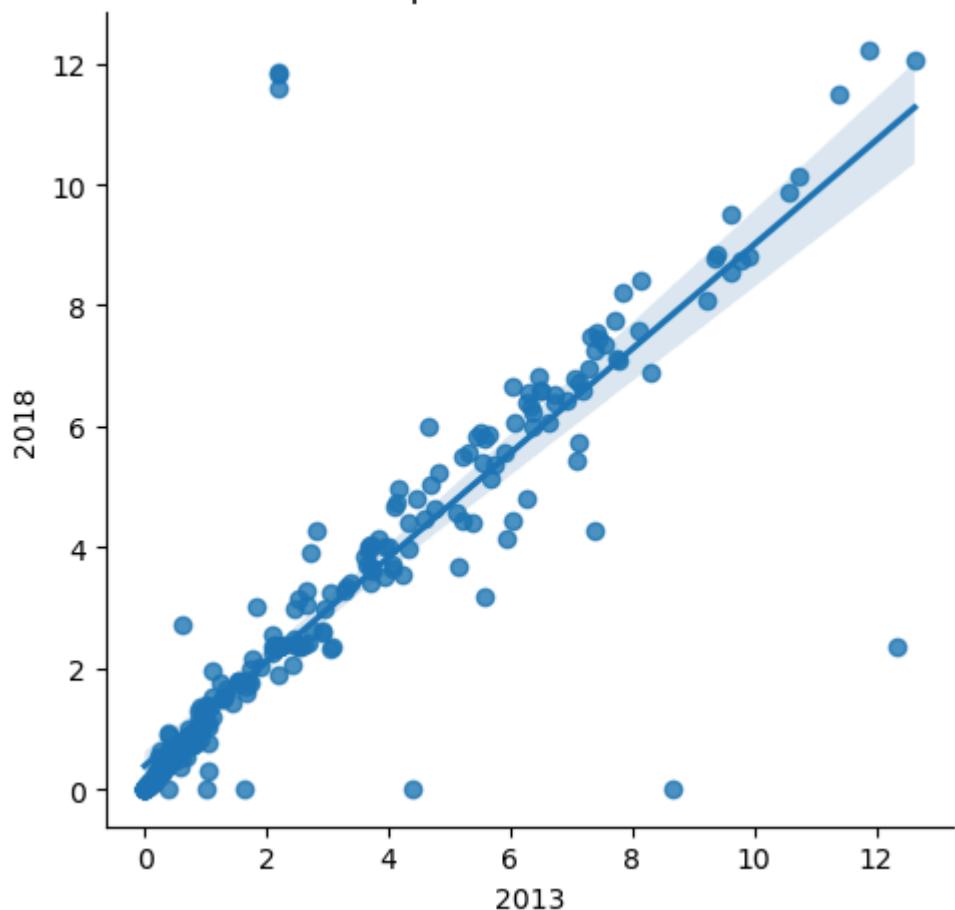
Scaterplot of 2013 vs 2017



Corelation between 2013 and 2017 : 0.8773509488007418

Corelation: Positively Corelated.

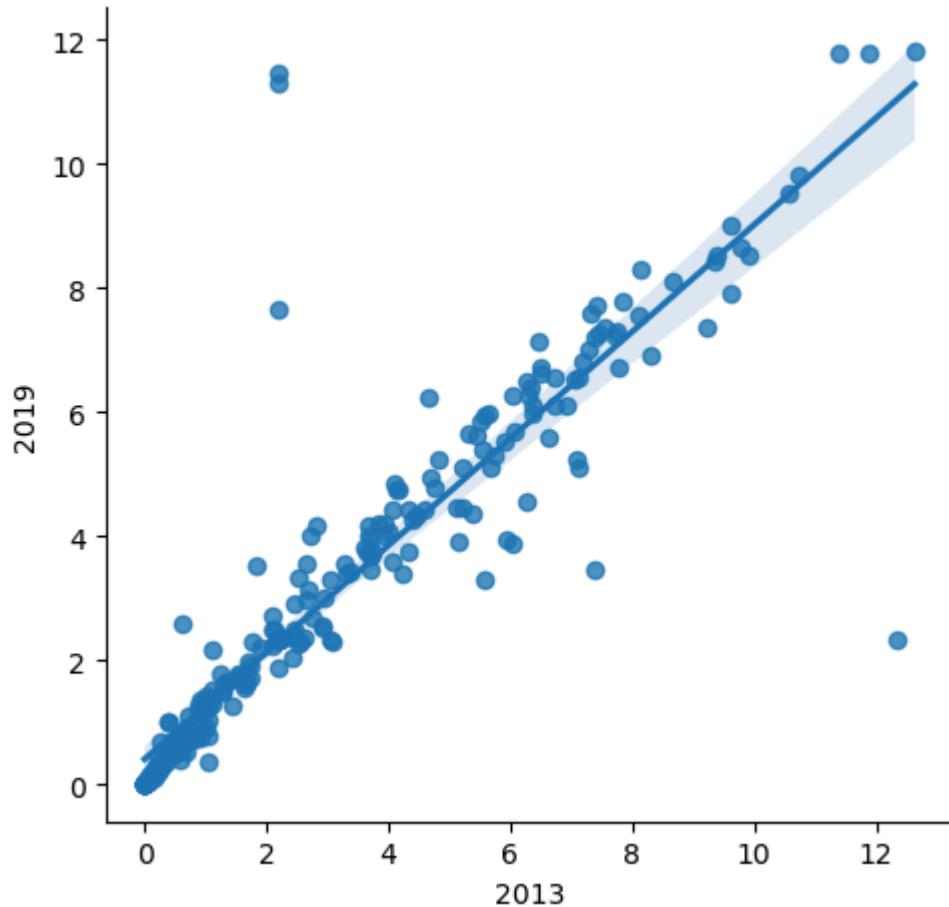
Scaterplot of 2013 vs 2018



Corelation between 2013 and 2018 : 0.8806484144744191

Corelation: Positively Corelated.

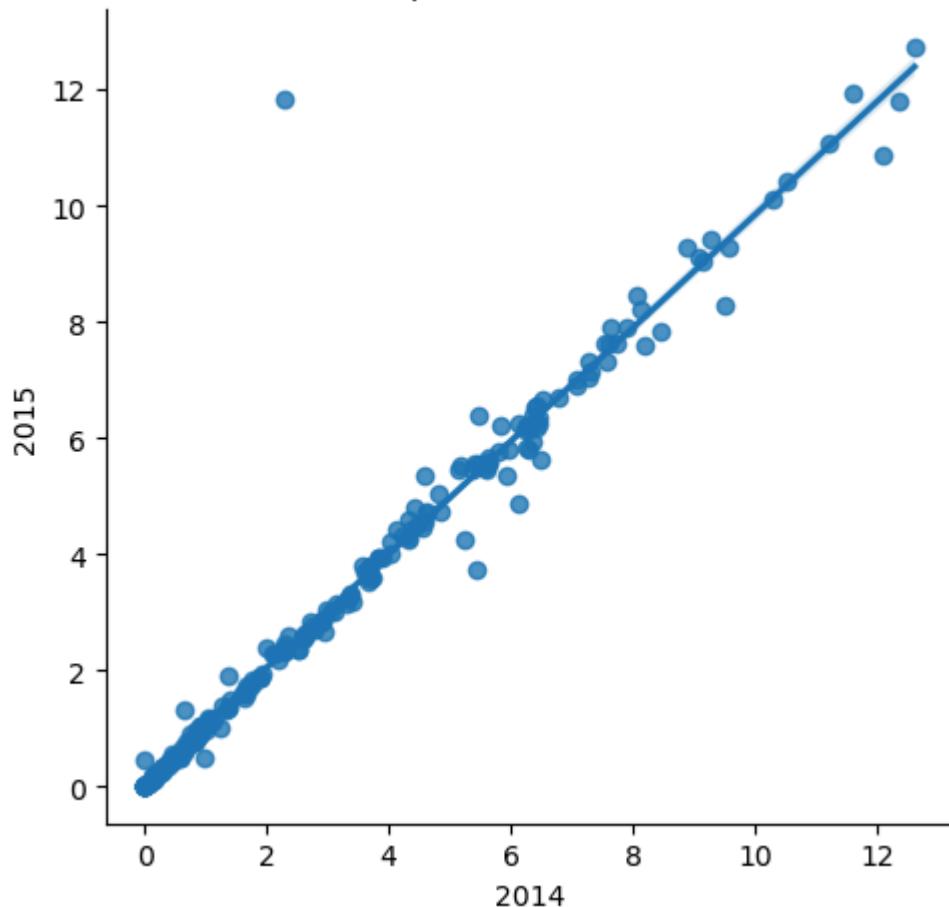
Scaterplot of 2013 vs 2019



Corelation between 2013 and 2019 : 0.9114385710136398

Corelation: Positively Corelated.

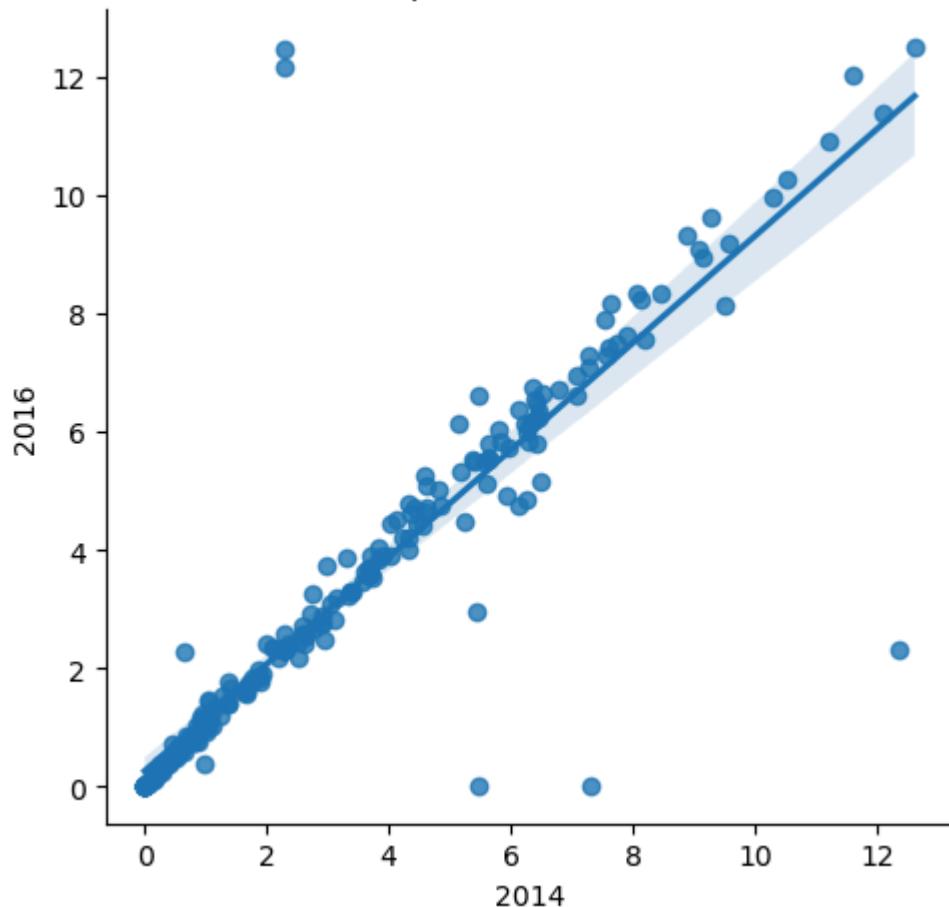
Scaterplot of 2014 vs 2015



Corelation between 2014 and 2015 : 0.9758792049482481

Corelation: Positively Corelated.

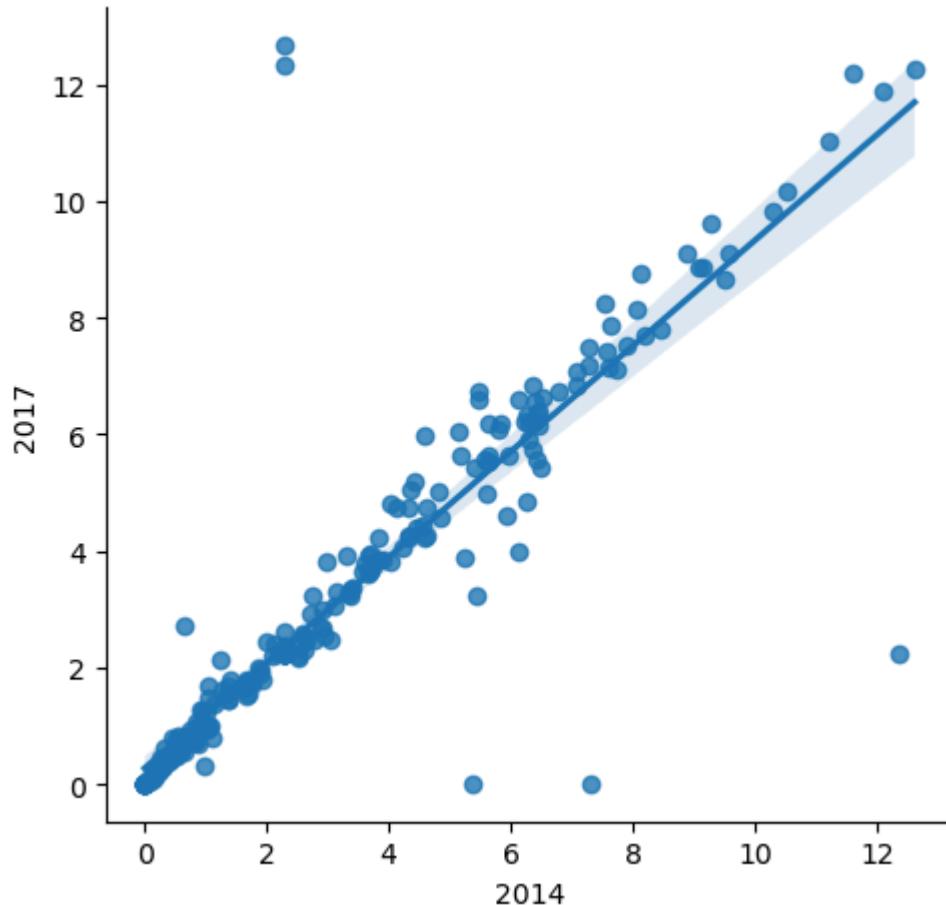
Scaterplot of 2014 vs 2016



Corelation between 2014 and 2016 : 0.9069749340530984

Corelation: Positively Corelated.

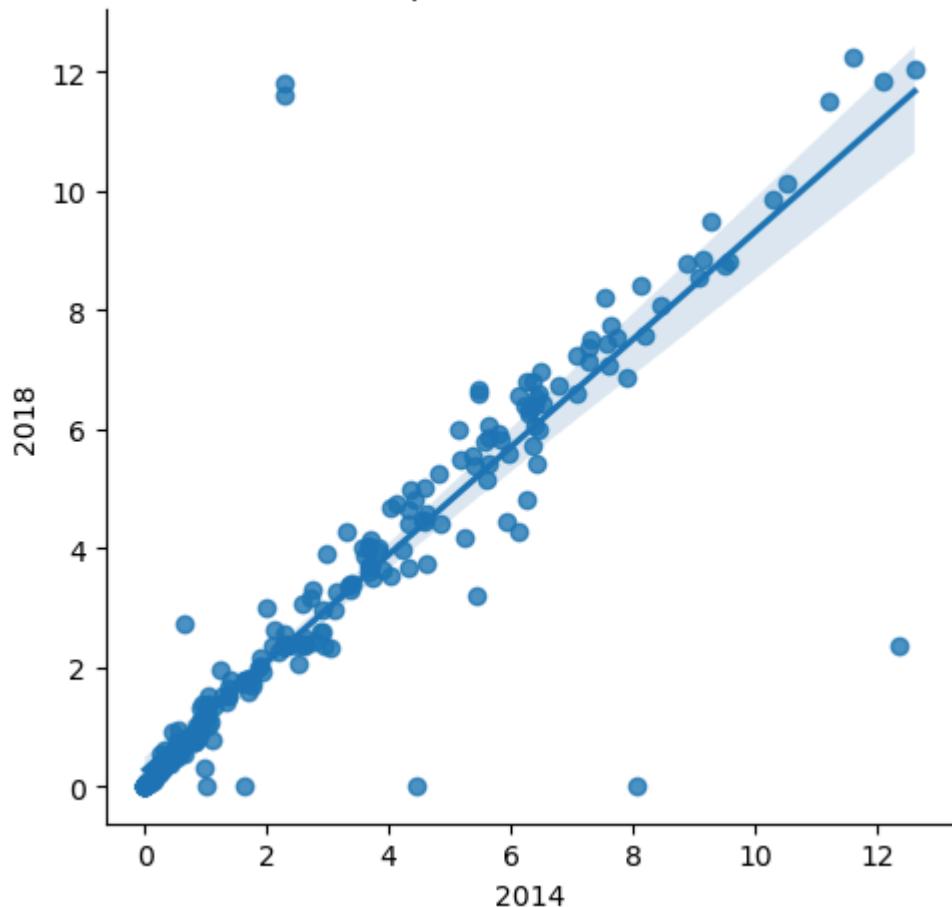
Scaterplot of 2014 vs 2017



Corelation between 2014 and 2017 : 0.9025737813716558

Corelation: Positively Corelated.

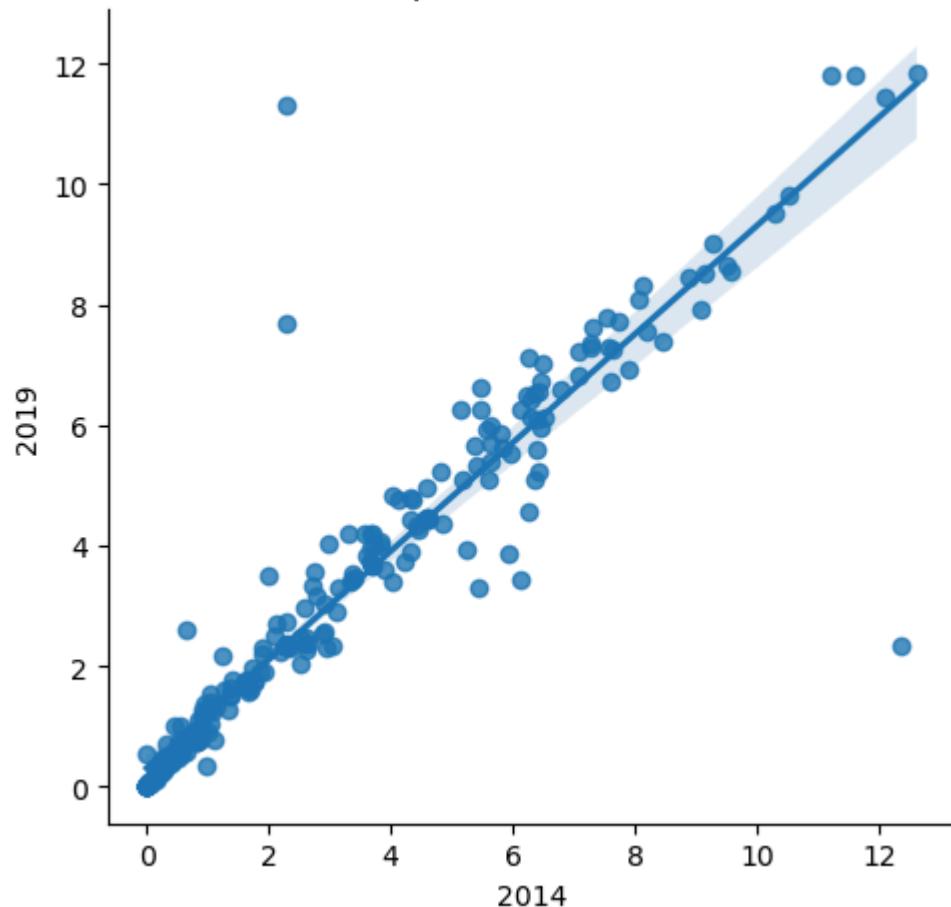
Scaterplot of 2014 vs 2018



Corelation between 2014 and 2018 : 0.9078889735347673

Corelation: Positively Corelated.

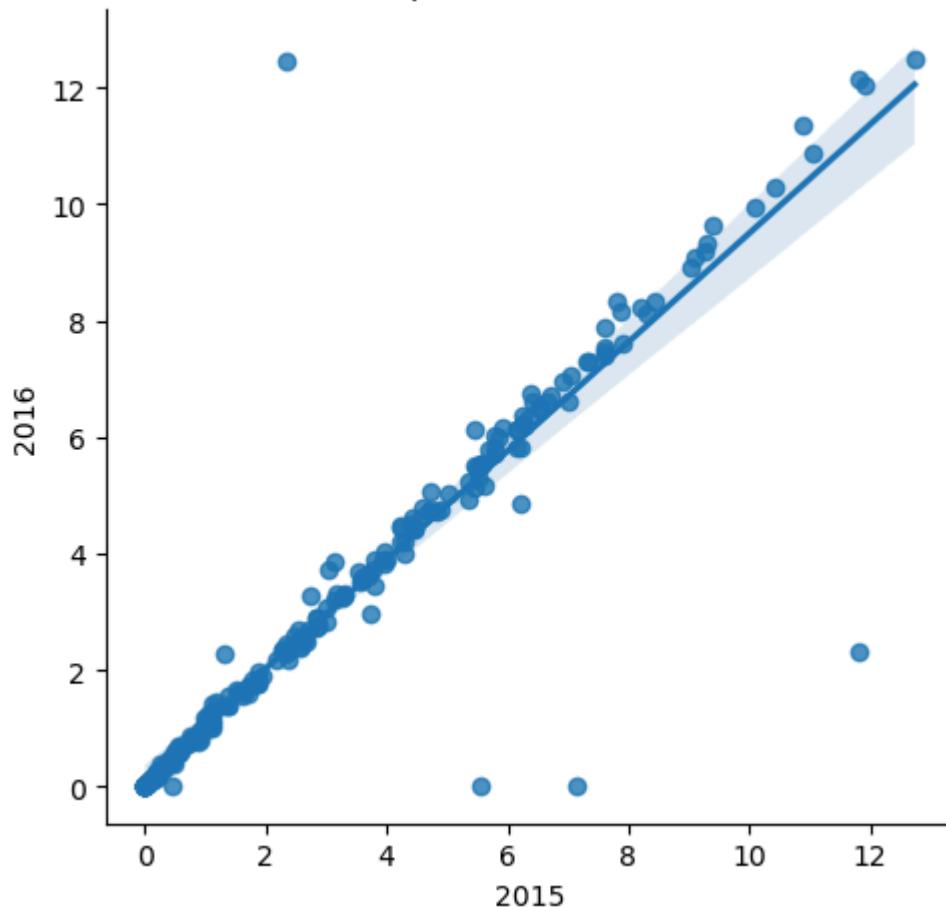
Scaterplot of 2014 vs 2019



Corelation between 2014 and 2019 : 0.9376049006412733

Corelation: Positively Corelated.

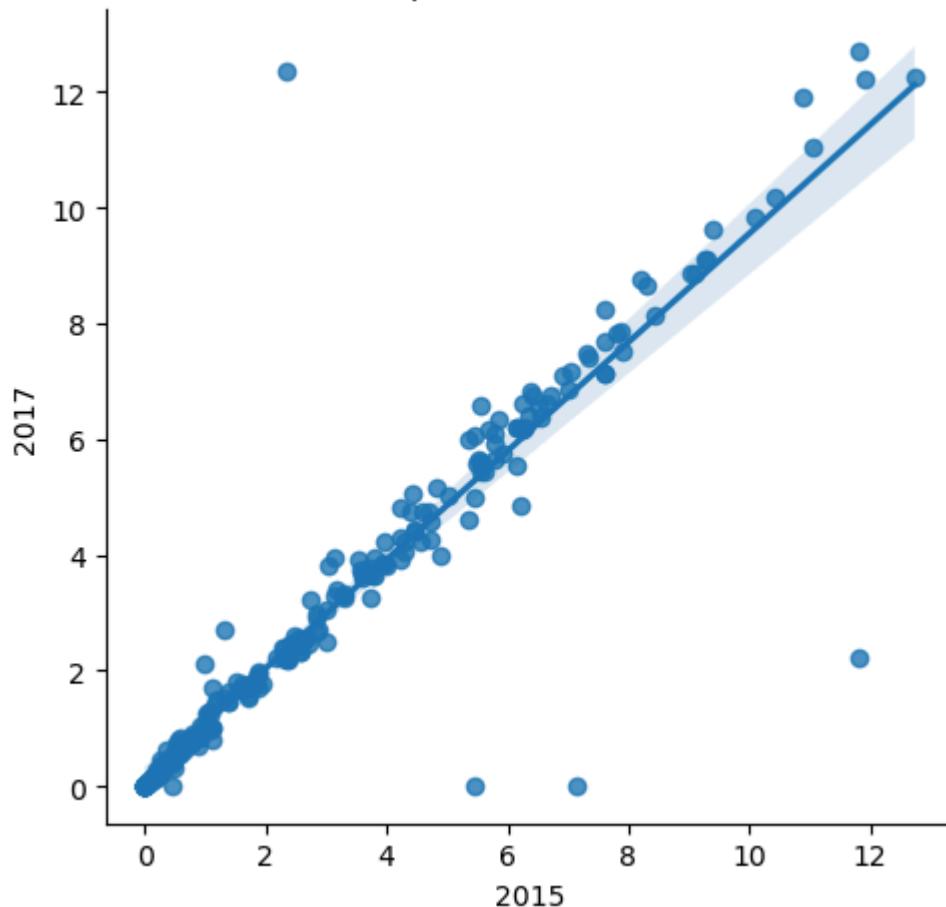
Scaterplot of 2015 vs 2016



Corelation between 2015 and 2016 : 0.9364597720567565

Corelation: Positively Corelated.

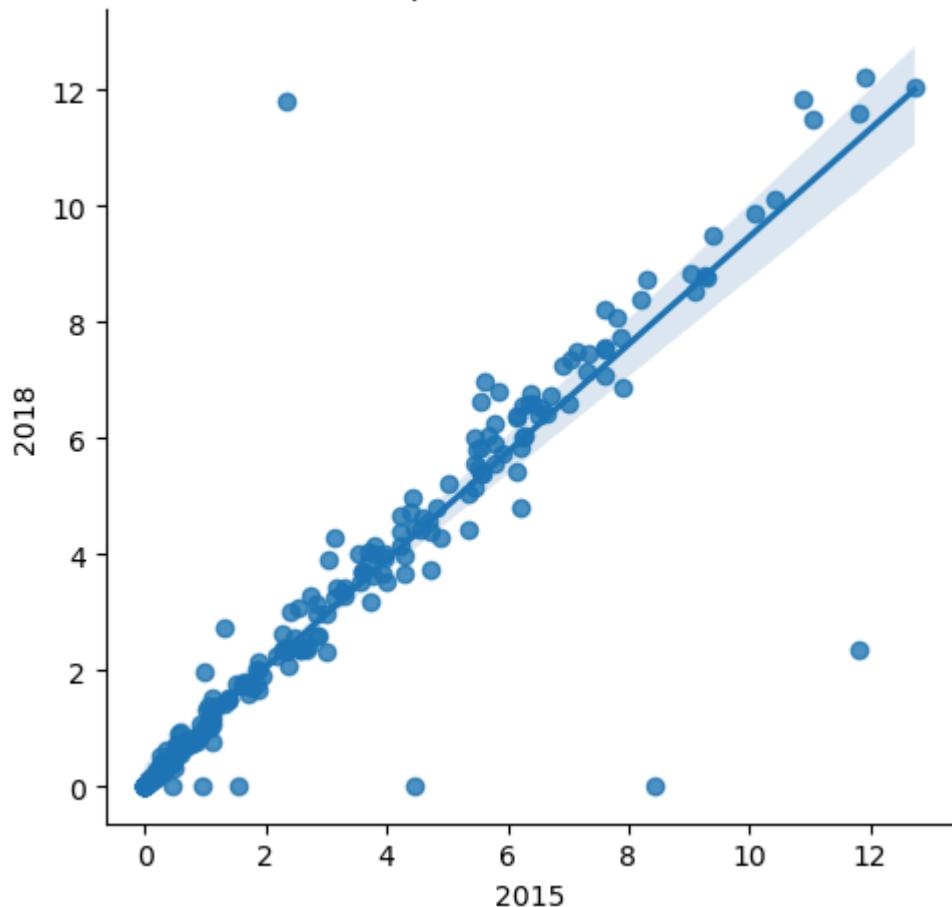
Scaterplot of 2015 vs 2017



Corelation between 2015 and 2017 : 0.9347300176605432

Corelation: Positively Corelated.

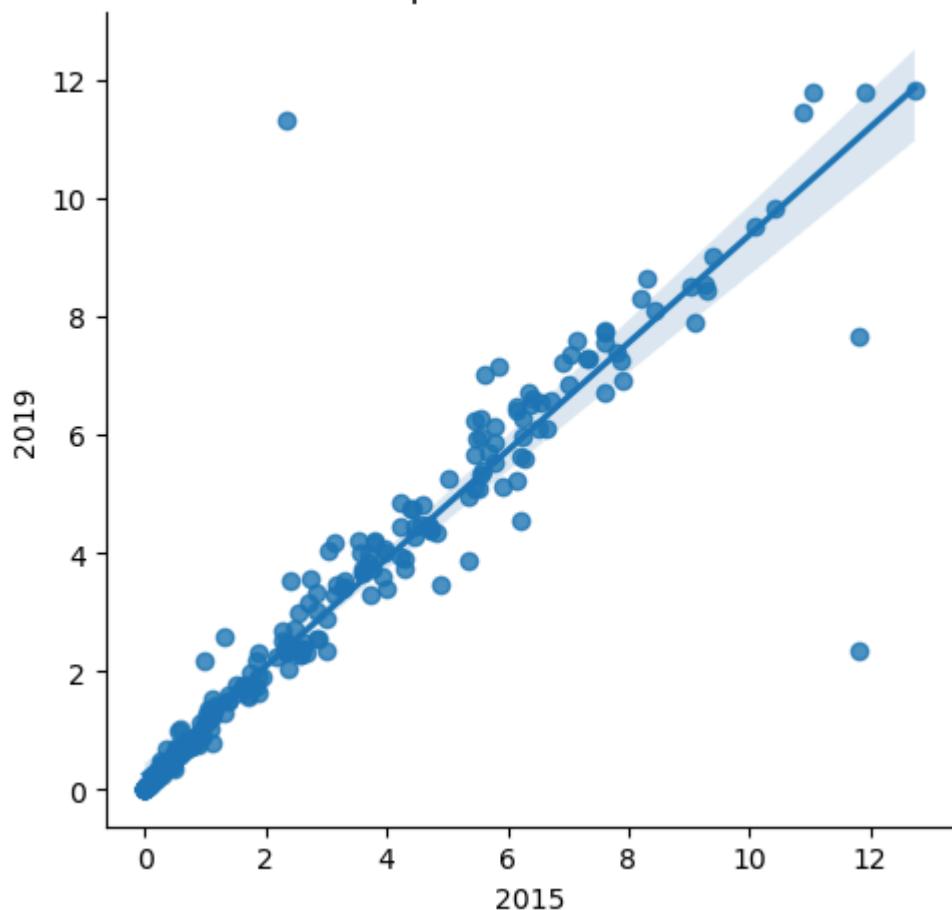
Scaterplot of 2015 vs 2018



Corelation between 2015 and 2018 : 0.932320627494452

Corelation: Positively Corelated.

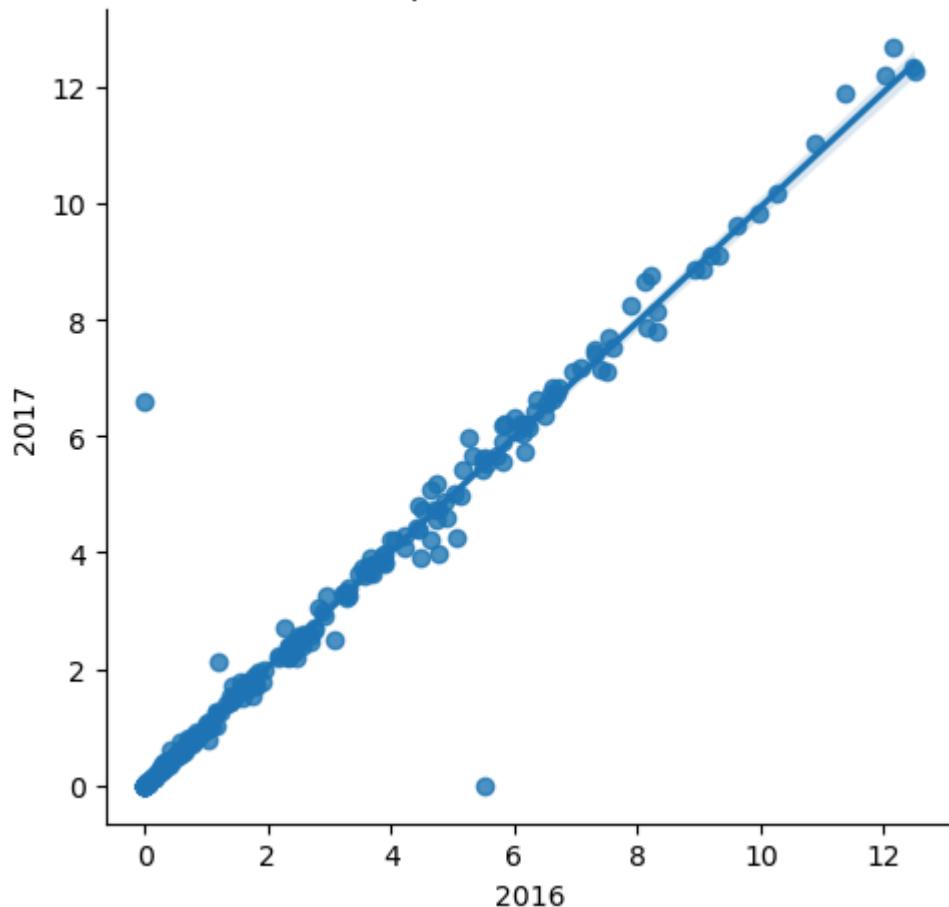
Scaterplot of 2015 vs 2019



Corelation between 2015 and 2019 : 0.9479401706237323

Corelation: Positively Corelated.

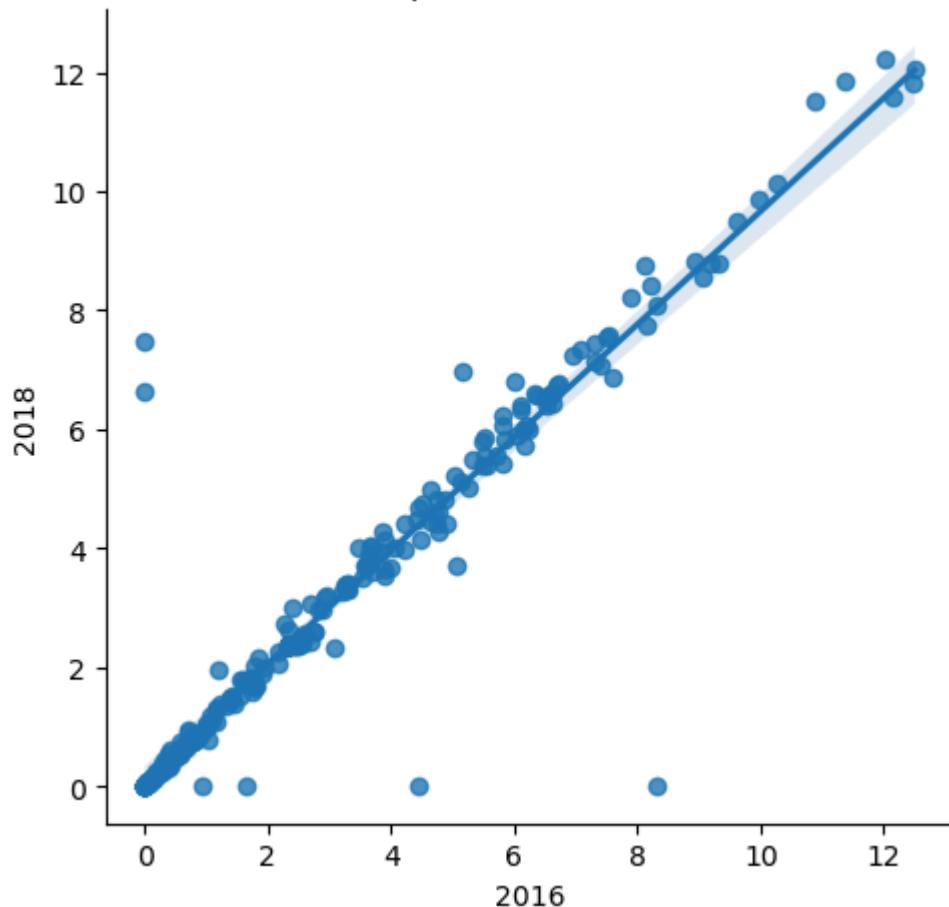
Scaterplot of 2016 vs 2017



Corelation between 2016 and 2017 : 0.9815042592344696

Corelation: Positively Corelated.

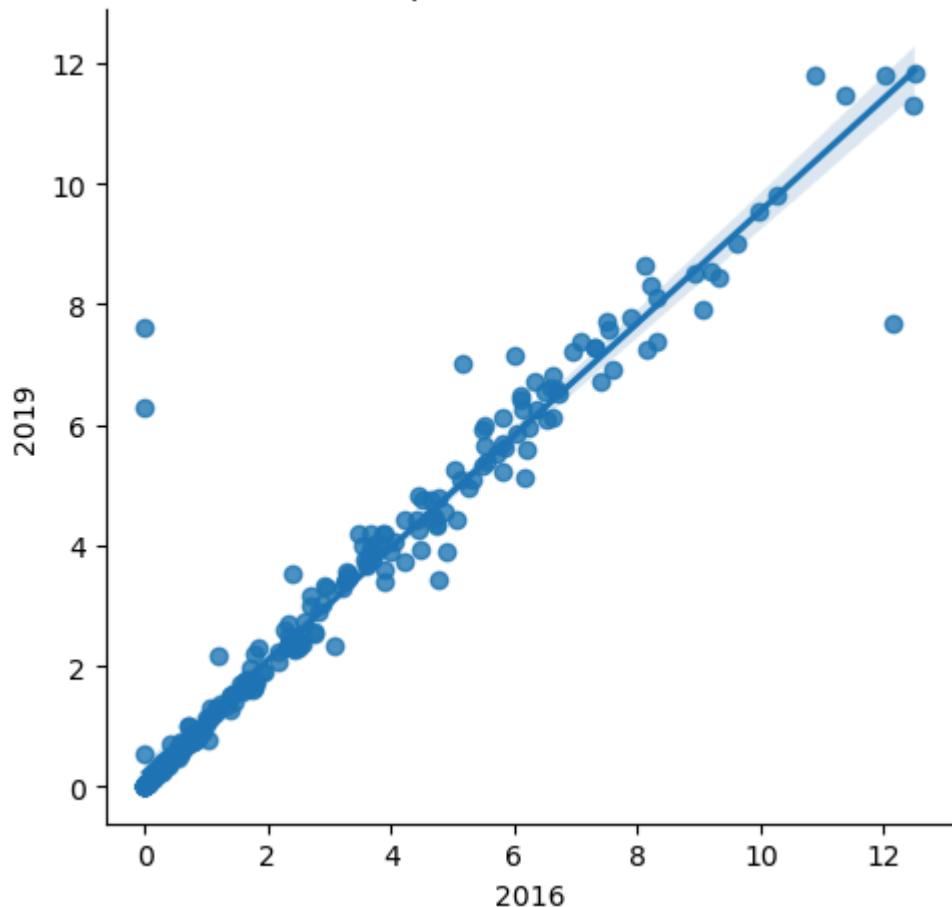
Scaterplot of 2016 vs 2018



Corelation between 2016 and 2018 : 0.9528977934623302

Corelation: Positively Corelated.

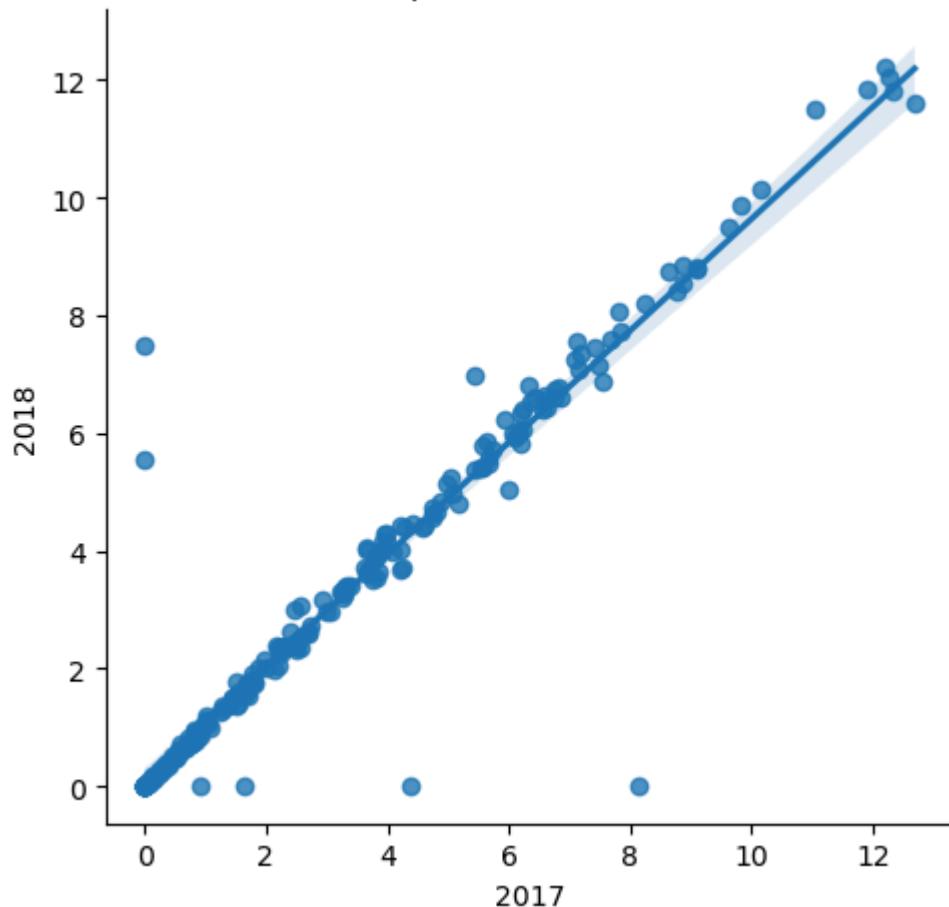
Scaterplot of 2016 vs 2019



Corelation between 2016 and 2019 : 0.9664592576402498

Corelation: Positively Corelated.

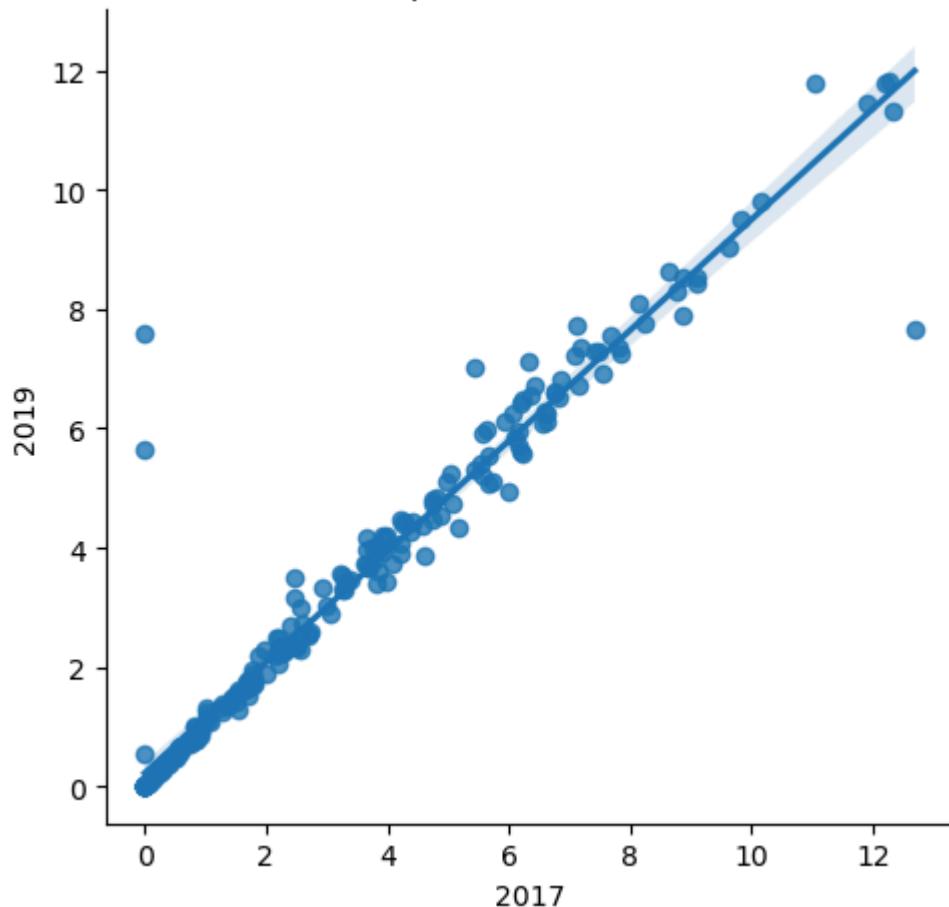
Scaterplot of 2017 vs 2018



Corelation between 2017 and 2018 : 0.9582162746819951

Corelation: Positively Corelated.

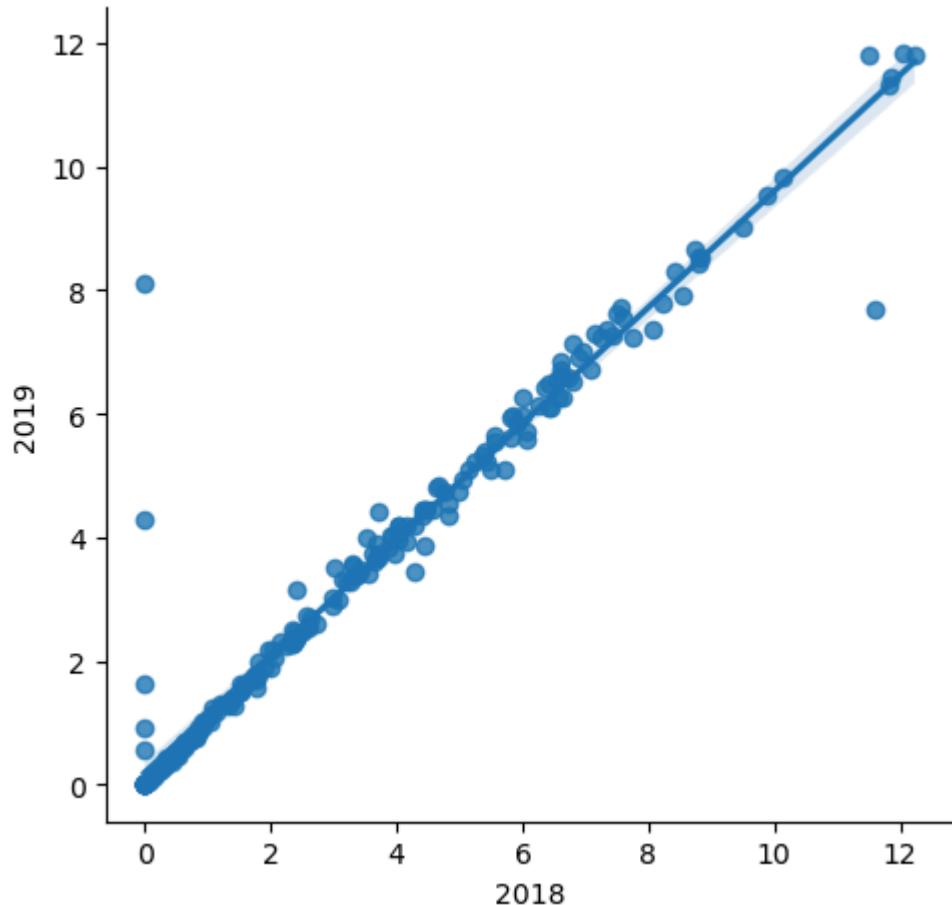
Scaterplot of 2017 vs 2019



Corelation between 2017 and 2019 : 0.9694551425267652

Corelation: Positively Corelated.

Scaterplot of 2018 vs 2019



Corelation between 2018 and 2019 : 0.9745548392630105

Corelation: Positively Corelated.

In [60]: # Univariate Analysis

In [61]: `new_df.loc[:,num].corr()`

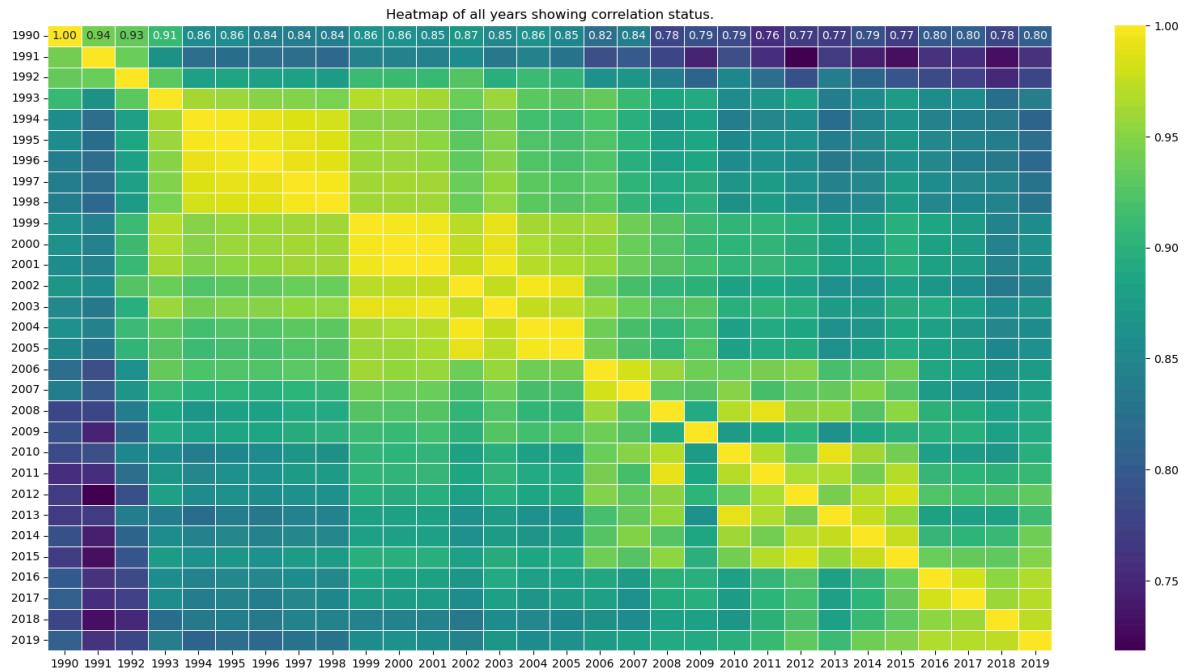
Out[61]:

	1990	1991	1992	1993	1994	1995	1996	1997	1998
1990	1.000000	0.941373	0.932991	0.909847	0.857901	0.855052	0.841599	0.837884	0.838407
1991	0.941373	1.000000	0.936403	0.865641	0.820025	0.823139	0.819189	0.818617	0.817336
1992	0.932991	0.936403	1.000000	0.929337	0.880932	0.884156	0.878442	0.879219	0.876548
1993	0.909847	0.865641	0.929337	1.000000	0.962034	0.958184	0.951035	0.947534	0.944080
1994	0.857901	0.820025	0.880932	0.962034	1.000000	0.997301	0.992072	0.985968	0.980795
1995	0.855052	0.823139	0.884156	0.958184	0.997301	1.000000	0.995342	0.990715	0.985725
1996	0.841599	0.819189	0.878442	0.951035	0.992072	0.995342	1.000000	0.992930	0.986845
1997	0.837884	0.818617	0.879219	0.947534	0.985968	0.990715	0.992930	1.000000	0.996395
1998	0.838407	0.817336	0.876548	0.944080	0.980795	0.985725	0.986845	0.996395	1.000000
1999	0.862512	0.847303	0.912716	0.970193	0.951214	0.957014	0.958325	0.961226	0.960918
2000	0.862234	0.847490	0.913308	0.967957	0.950104	0.957339	0.957701	0.962021	0.961271
2001	0.854337	0.841669	0.909039	0.963452	0.946137	0.953630	0.955241	0.960696	0.959471
2002	0.870294	0.855044	0.925682	0.936730	0.922451	0.929837	0.931298	0.936791	0.936800
2003	0.851080	0.831068	0.896129	0.957565	0.941349	0.947754	0.950220	0.954934	0.954709
2004	0.864320	0.842165	0.911946	0.930327	0.916091	0.922690	0.924128	0.929831	0.930415
2005	0.852859	0.828341	0.903960	0.926106	0.911506	0.918355	0.917491	0.924183	0.926347
2006	0.822790	0.787578	0.860068	0.934361	0.921417	0.923780	0.923937	0.927765	0.929890
2007	0.838218	0.798158	0.868072	0.910318	0.896297	0.901275	0.898075	0.902665	0.905914
2008	0.777830	0.778019	0.840759	0.883928	0.868239	0.876925	0.880627	0.891286	0.891251
2009	0.789071	0.748940	0.812576	0.889432	0.881087	0.884286	0.883427	0.894736	0.899096
2010	0.785857	0.787378	0.852924	0.855032	0.840982	0.853696	0.855624	0.866688	0.865435
2011	0.757804	0.757000	0.822856	0.867040	0.850759	0.859602	0.861622	0.874841	0.873956
2012	0.771201	0.718433	0.788823	0.878067	0.856687	0.861695	0.854977	0.862687	0.863827
2013	0.770242	0.770235	0.839643	0.838755	0.824373	0.838185	0.835668	0.847940	0.846902
2014	0.787936	0.741993	0.811252	0.856679	0.843208	0.851737	0.842022	0.849840	0.850561
2015	0.771294	0.730461	0.796049	0.874536	0.863232	0.870239	0.863929	0.873266	0.873551
2016	0.800518	0.758619	0.782293	0.857999	0.845672	0.851839	0.849022	0.854653	0.850499
2017	0.803598	0.756130	0.774653	0.855795	0.838252	0.843807	0.839714	0.851962	0.853160
2018	0.778710	0.730796	0.750855	0.824738	0.831898	0.838581	0.834017	0.846244	0.848123
2019	0.803856	0.758050	0.779371	0.836793	0.812999	0.821341	0.814843	0.826865	0.829109

30 rows × 30 columns



```
In [62]: plt.figure(figsize = (20,10))
sns.heatmap(new_df.loc[:,num].corr(), annot = True, fmt='.2f', cmap='viridis')
plt.title('Heatmap of all years showing correlation status.')
plt.show()
```



Aanalysis

```
In [63]: new_df = new_df.sort_values(['region','incomegroup'])
```

In [64]: `new_df.head()`

Out[64]:

		country name	country code	indicator name	indicator code	1990	1991	1992	199
13	Australia	AUS		CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	1.466984	1.393773	1.543857	1.46809
31	Brunei Darussalam	BRN		CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	12.446168	12.525013	12.940854	1.46809
84	French Polynesia	PYF		CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.000000	0.000000	0.000000	0.00000
94	Guam	GUM		CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.000000	0.000000	0.000000	0.00000
103	Hong Kong SAR, China	HKG		CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC	0.000000	0.000000	0.000000	0.00000

5 rows × 38 columns



In [65]: `region = new_df.groupby('region')`

In [66]: `region.groups.keys()`

Out[66]: `dict_keys(['East Asia & Pacific', 'Europe & Central Asia', 'Latin America & Caribbean', 'Middle East & North Africa', 'North America', 'South Asia', 'Sub-Saharan Africa', 'Unknown'])`

```
In [67]: for i in region.groups.keys():
    df_region = new_df[new_df['region'] == i]
    top_5 = df_region.sort_values('total emission', ascending = False).head(5)
    print(top_5)
    print()
```

	region	country name
31	East Asia & Pacific	Brunei Darussalam
13	East Asia & Pacific	Australia
188	East Asia & Pacific	Palau
126	East Asia & Pacific	Korea, Rep.
120	East Asia & Pacific	Japan

	region	country name
21	Europe & Central Asia	Belgium
32	Europe & Central Asia	Bulgaria
20	Europe & Central Asia	Belarus
146	Europe & Central Asia	Luxembourg
27	Europe & Central Asia	Bosnia and Herzegovina

	region	country name
16	Latin America & Caribbean	Bahamas, The
22	Latin America & Caribbean	Belize
29	Latin America & Caribbean	Brazil
26	Latin America & Caribbean	Bolivia
244	Latin America & Caribbean	Trinidad and Tobago

	region	country name
17	Middle East & North Africa	Bahrain
199	Middle East & North Africa	Qatar
252	Middle East & North Africa	United Arab Emirates
128	Middle East & North Africa	Kuwait
208	Middle East & North Africa	Saudi Arabia

	region	country name
254	North America	United States
38	North America	Canada
24	North America	Bermuda

	region	country name
151	South Asia	Maldives
111	South Asia	India
187	South Asia	Pakistan
225	South Asia	Sri Lanka
25	South Asia	Bhutan

	region	country name
220	Sub-Saharan Africa	South Africa
69	Sub-Saharan Africa	Equatorial Guinea
211	Sub-Saharan Africa	Seychelles
85	Sub-Saharan Africa	Gabon
28	Sub-Saharan Africa	Botswana

	region	country name
179	Unknown	North America
196	Unknown	Post-demographic dividend
101	Unknown	High income
183	Unknown	OECD members
74	Unknown	Euro area

In [68]: df = new_df.sort_values(['region', 'total emission'], ascending=[True, False])

Out[68]:

	country name
region	
East Asia & Pacific	Brunei Darussalam
East Asia & Pacific	Australia
East Asia & Pacific	Palau
East Asia & Pacific	Korea, Rep.
East Asia & Pacific	Japan
Europe & Central Asia	Belgium
Europe & Central Asia	Bulgaria
Europe & Central Asia	Belarus
Europe & Central Asia	Luxembourg
Europe & Central Asia	Bosnia and Herzegovina
Latin America & Caribbean	Bahamas, The
Latin America & Caribbean	Belize
Latin America & Caribbean	Brazil
Latin America & Caribbean	Bolivia
Latin America & Caribbean	Trinidad and Tobago
Middle East & North Africa	Bahrain
Middle East & North Africa	Qatar
Middle East & North Africa	United Arab Emirates
Middle East & North Africa	Kuwait
Middle East & North Africa	Saudi Arabia
North America	United States
North America	Canada
North America	Bermuda
South Asia	Maldives
South Asia	India
South Asia	Pakistan
South Asia	Sri Lanka
South Asia	Bhutan
Sub-Saharan Africa	South Africa
Sub-Saharan Africa	Equatorial Guinea
Sub-Saharan Africa	Seychelles
Sub-Saharan Africa	Gabon
Sub-Saharan Africa	Botswana
Unknown	North America
Unknown	Post-demographic dividend
Unknown	High income
Unknown	OECD members

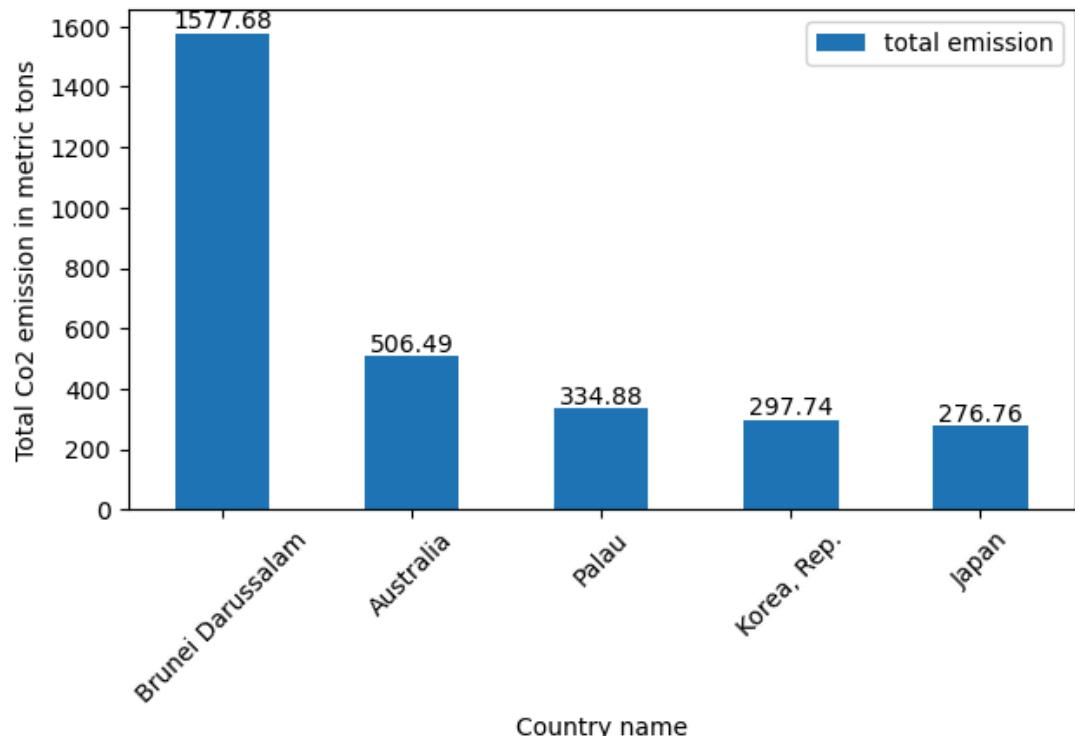
country name**region**

Unknown**Euro area**

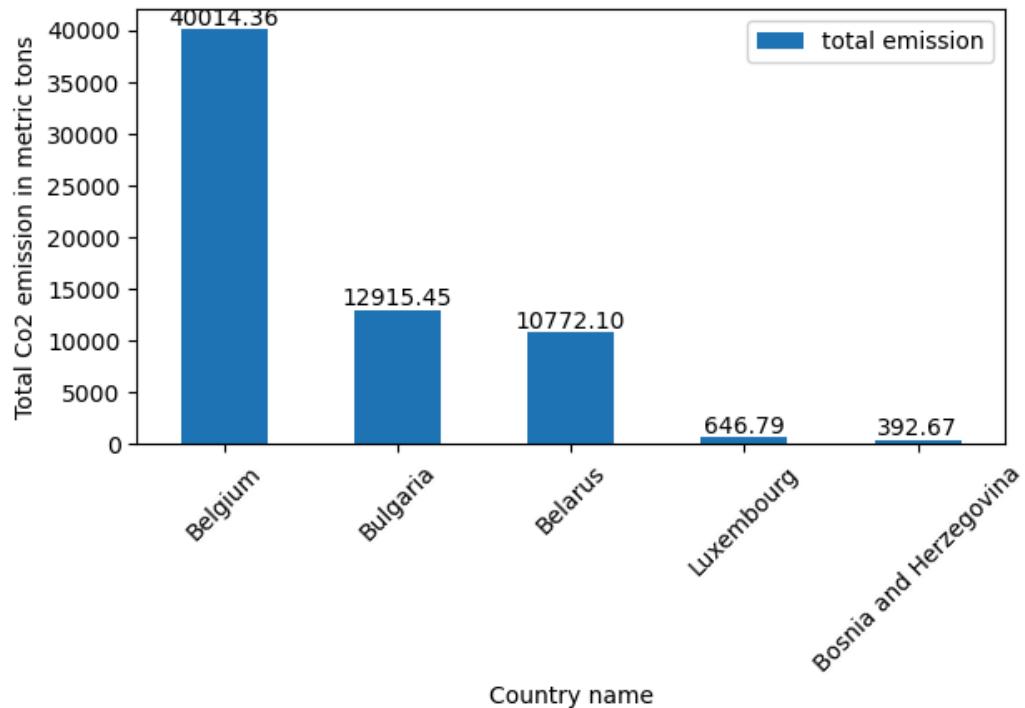
```
In [69]: for i in region.groups.keys():
    df_region = new_df[new_df['region'] == i]
    plt.figure(figsize=(10,8))
    ax = df_region.sort_values('total emission', ascending = False).head(5)[['Country name', 'total emission']]
    ax.bar_label(ax.containers[0], fmt = '%.2f')
    plt.suptitle(f'Top 5 countries with Co2 emission in {i} region from 1991-2018')
    plt.xlabel(f'Country name')
    plt.ylabel(f'Total Co2 emission in metric tons')
    plt.xticks(rotation=45)
    plt.tight_layout()
    plt.show()
```

<Figure size 1000x800 with 0 Axes>

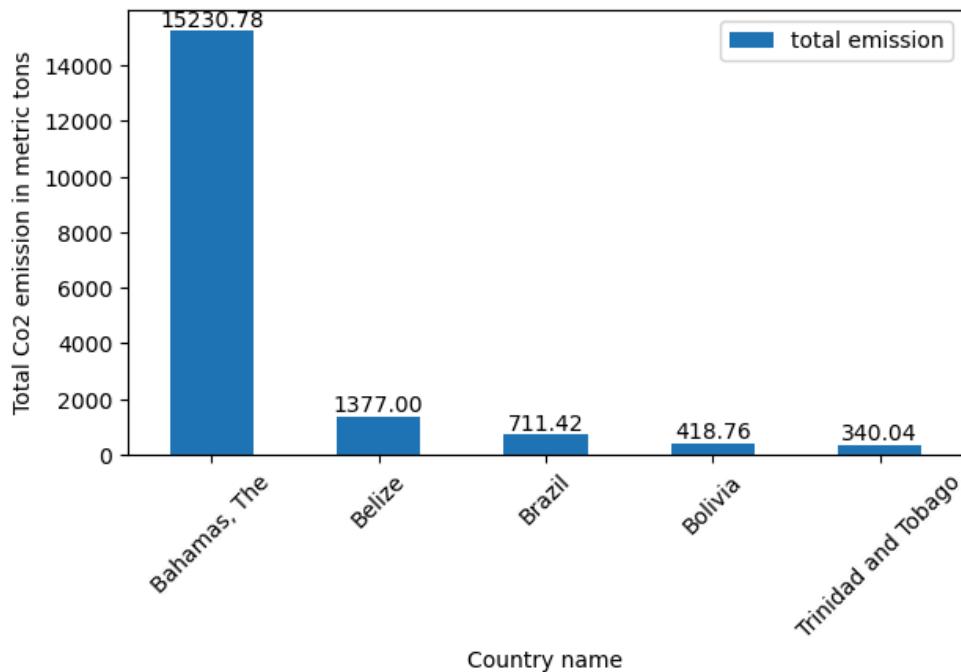
Top 5 countries with Co2 emission in East Asia & Pacific region from 1991-2018



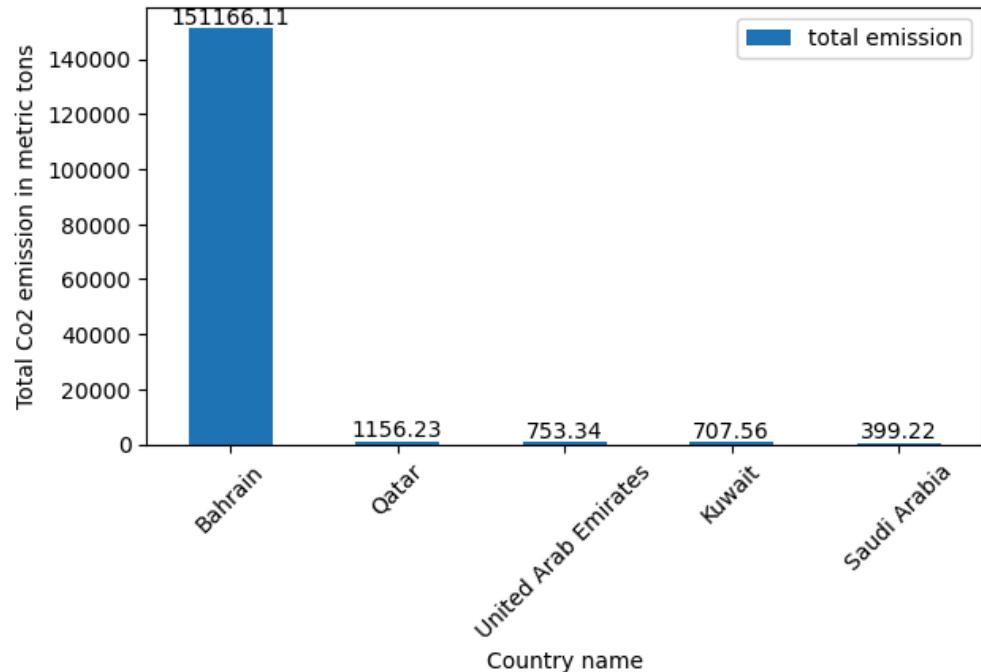
<Figure size 1000x800 with 0 Axes>

Top 5 countries with Co2 emission in Europe & Central Asia region from 1991-2018

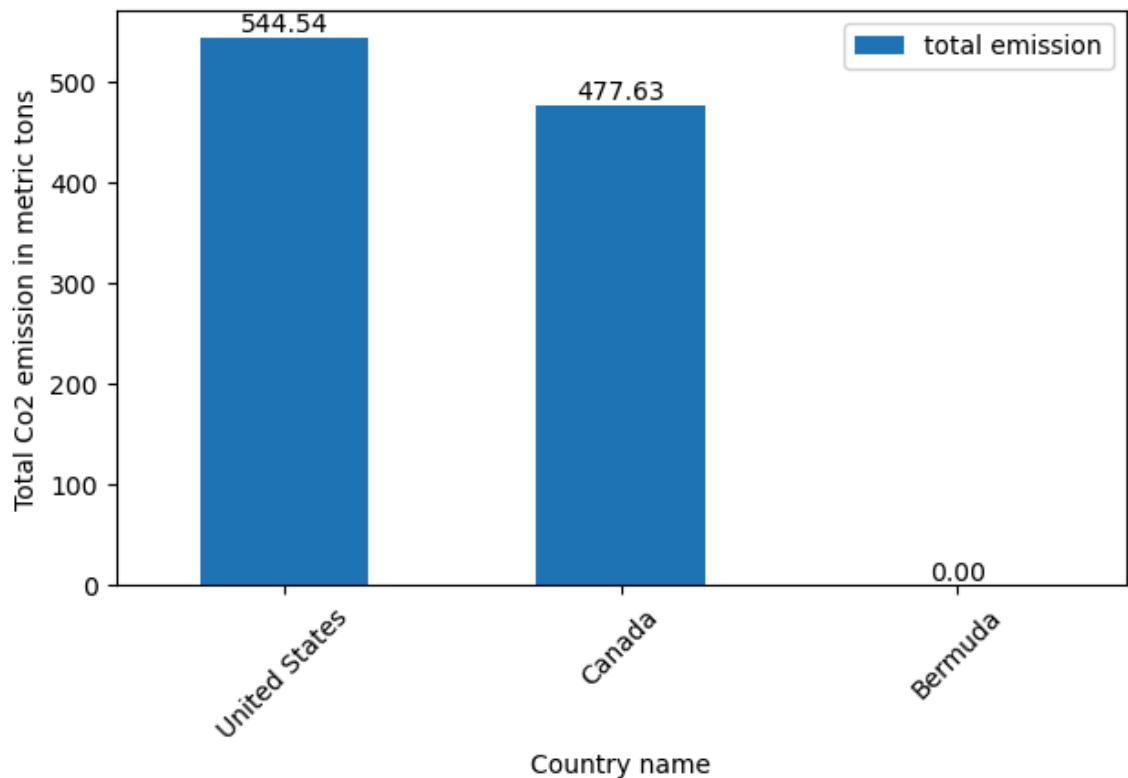
<Figure size 1000x800 with 0 Axes>

Top 5 countries with Co2 emission in Latin America & Caribbean region from 1991-2018

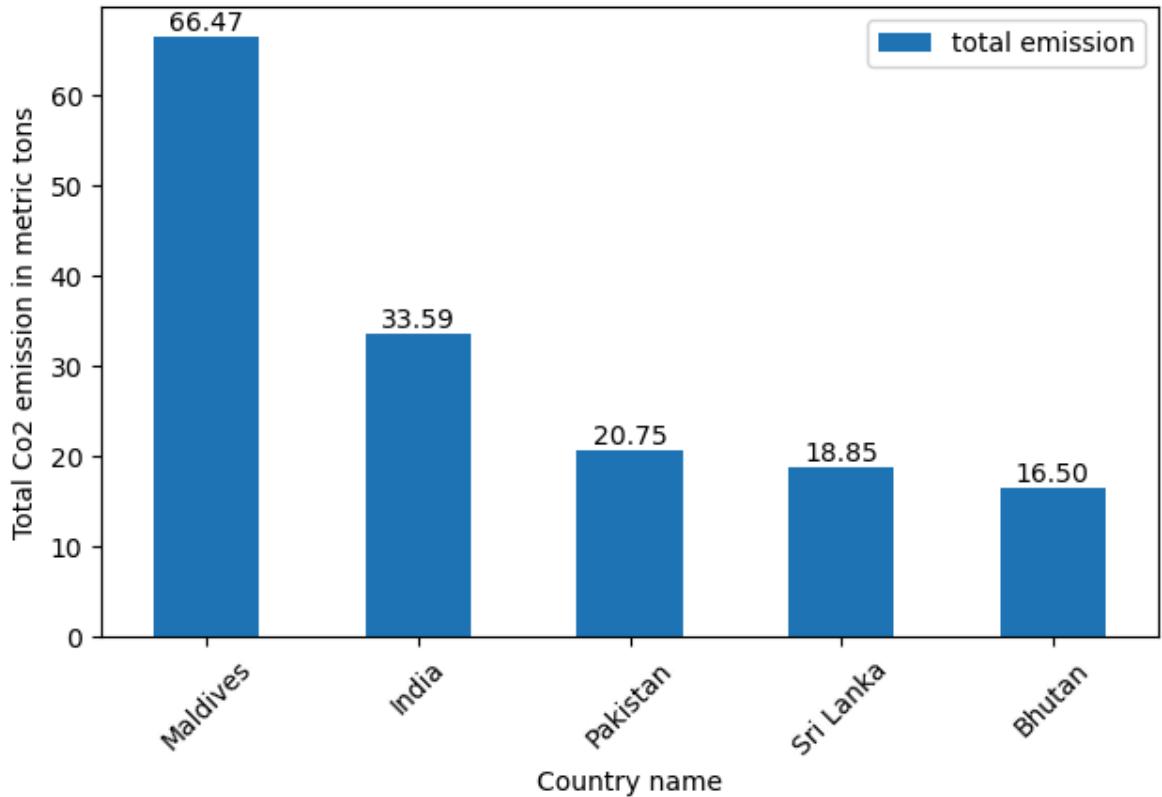
<Figure size 1000x800 with 0 Axes>

Top 5 countries with Co2 emission in Middle East & North Africa region from 1991-2018

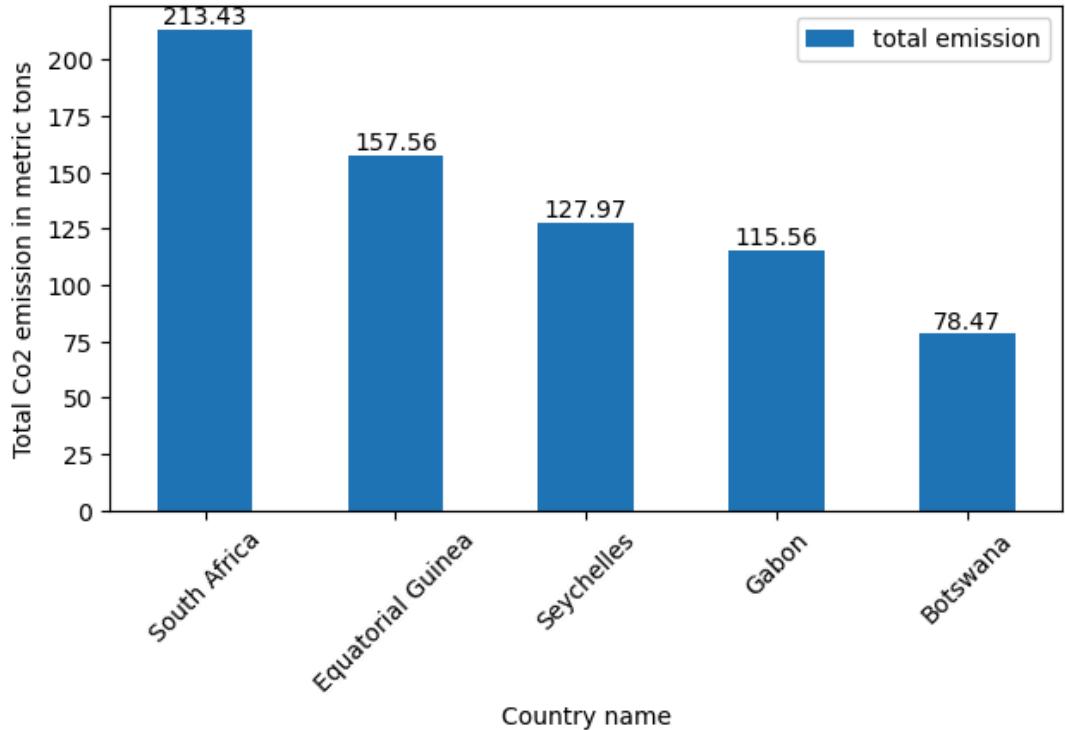
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Top 5 countries with Co2 emission in North America region from 1991-2018

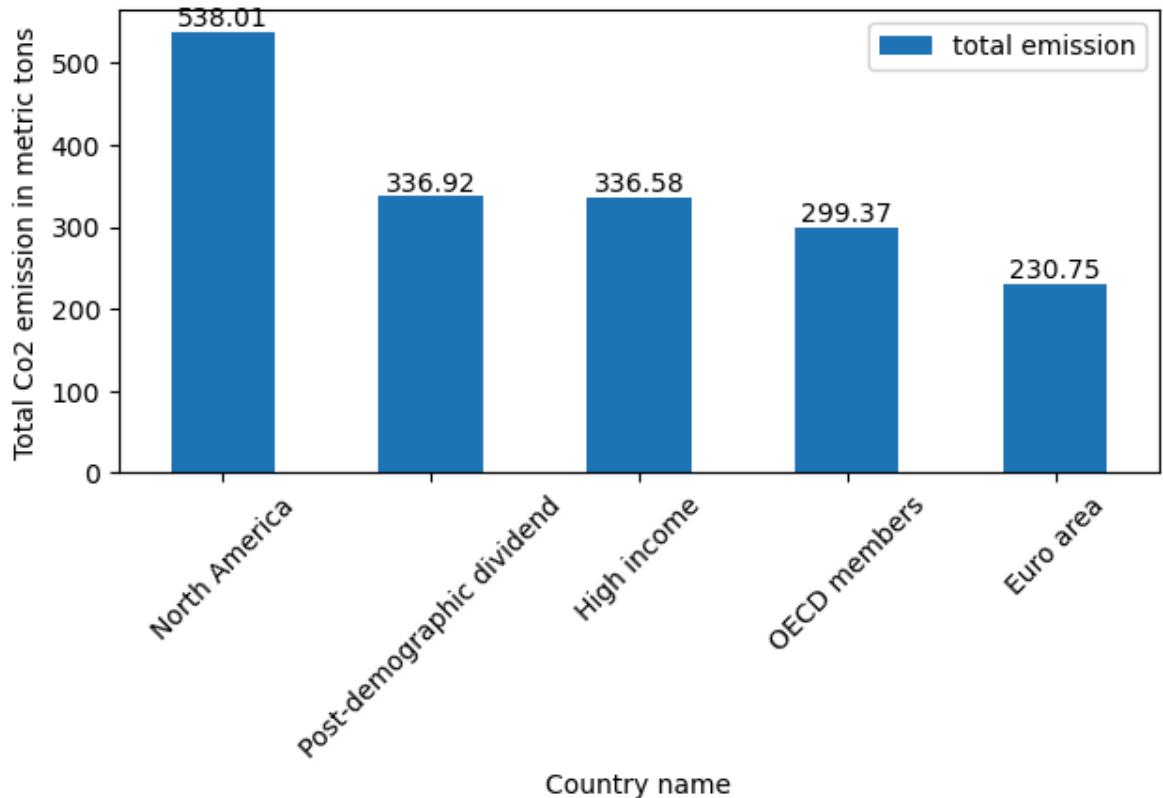
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Top 5 countries with Co2 emission in South Asia region from 1991-2018

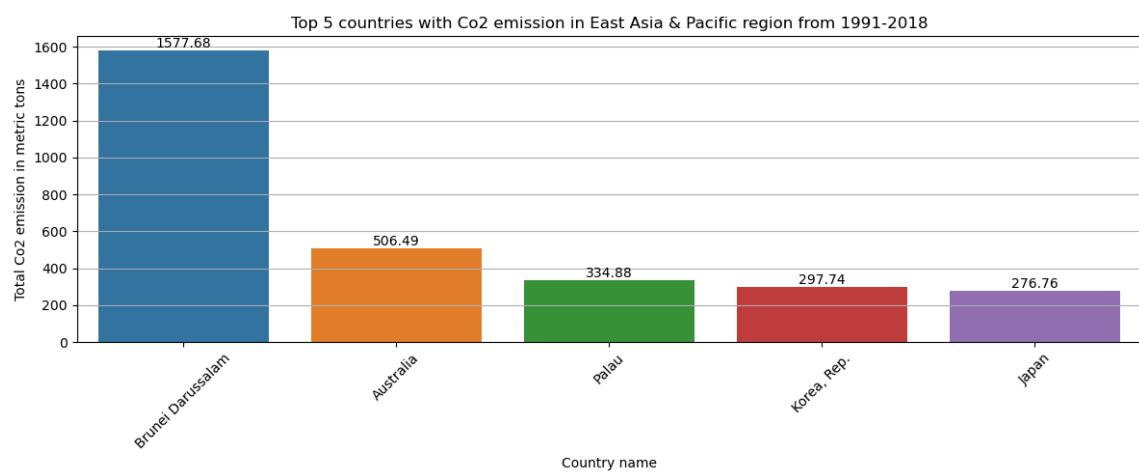
<Figure size 1000x800 with 0 Axes>

Top 5 countries with Co2 emission in Sub-Saharan Africa region from 1991-2018

<Figure size 1000x800 with 0 Axes>

Top 5 countries with Co2 emission in Unknown region from 1991-2018

```
In [70]: for i in region.groups.keys():
    df_region = new_df[new_df['region'] == i]
    top_5 = df_region.sort_values('total emission', ascending = False).head(5)
    plt.figure(figsize=(12,5))
    ax = sns.barplot(x='country name', y='total emission', data=top_5)
    ax.bar_label(ax.containers[0], fmt = '%.2f')
    plt.title(f'Top 5 countries with Co2 emission in {i} region from 1991-2018')
    plt.xlabel('Country name')
    plt.ylabel('Total Co2 emission in metric tons')
    plt.xticks(rotation=45)
    ax.yaxis.grid(True)
    plt.tight_layout()
    plt.show()
```



```
In [71]: # plt.savefig(f'{region_name}_top5.png')
```

```
In [ ]:
```