

```
In [11]: import pandas as pd
import matplotlib.pyplot as pp
import seaborn
import numpy as np
```

```
In [12]: milex2010 =pd.read_csv(r'C:\Users\Student\Desktop\2010milex.csv')
milex2011 =pd.read_csv(r'C:\Users\Student\Desktop\2011milex.csv')
milex2012 =pd.read_csv(r'C:\Users\Student\Desktop\2012milex.csv')
milex2013 =pd.read_csv(r'C:\Users\Student\Desktop\2013milex.csv')
milex2014 =pd.read_csv(r'C:\Users\Student\Desktop\2014milex.csv')
```

```
In [13]: milex2010['year']='2010'
milex2011['year']='2011'
milex2012['year']='2012'
milex2013['year']='2013'
milex2014['year']='2014'
yearsmlcx=pd.concat([milex2010,milex2011,milex2012,milex2013,milex
2014])
yearsmlcx=yearsmlcx.set_index(['country','year']).sort_index()
yearsmlcx
```

Out[13]:

		milex
country	year	
Australia	2010	23218
	2011	26597
	2012	26217
	2013	24825
	2014	25411
Brazil	2010	34003
	2011	36936
	2012	33987
	2013	32958
	2014	31744
Canada	2010	19316
	2011	20483
	2012	20375
	2013	18464
	2014	17452
China, P. R.	2010	123333
	2011	147258
	2012	169604
	2013	191228
	2014	216371
France	2010	61782
	2011	64601
	2012	60035
	2013	62417
	2014	62289
Germany	2010	46256
	2011	48140
	2012	46471
	2013	47667

	2014	46455
...
Saudi Arabia	2010	45245
	2011	48531
	2012	56498
	2013	67020
	2014	80762
Spain	2010	14743
	2011	13983
	2012	13912
	2013	12607
	2014	12732
Turkey	2010	17749
	2011	17130
	2012	17810
	2013	18431
	2014	22618
UAE	2010	17505
	2011	19182
	2012	19024
	2013	23561
	2014	22755
UK	2010	58083
	2011	60270
	2012	58496
	2013	56861
	2014	60482
USA	2010	698180
	2011	711338
	2012	684780
	2013	639704
	2014	609914

90 rows × 1 columns

```
In [14]: milex=years_milex.copy()
```

```
In [15]: GDP_PPP=pd.read_csv(r'C:\Users\Student\Desktop\G.csv').set_index('country')
GDP_PPP
```

```
Out[15]:
```

	2010	2011	2012	2013	2014
country					
USA	1.496437e+13	1.551793e+13	1.616316e+13	1.676805e+13	1.741900e+13
China, P. R.	1.235873e+13	1.381026e+13	1.514773e+13	1.655471e+13	1.801707e+13
France	2.332312e+12	2.438939e+12	2.445463e+12	2.478251e+12	2.571970e+12
Russia/USSR	2.928122e+12	3.226600e+12	3.445923e+12	3.592401e+12	3.745157e+12
UK	2.250494e+12	2.314654e+12	2.395635e+12	2.483661e+12	2.565070e+12
Japan	4.321149e+12	4.386152e+12	4.540945e+12	4.612630e+12	4.630941e+12
Germany	3.239361e+12	3.447162e+12	3.506642e+12	3.553605e+12	3.704911e+12
India	5.370599e+12	5.845362e+12	6.252659e+12	6.783639e+12	7.384099e+12
Saudi Arabia	1.217779e+12	1.366704e+12	1.466150e+12	1.527724e+12	1.603764e+12
Italy	2.057881e+12	2.131797e+12	2.114542e+12	2.109334e+12	2.128762e+12
Brazil	2.803888e+12	2.973856e+12	3.080598e+12	3.212283e+12	3.263867e+12
Korea, South	1.505299e+12	1.559447e+12	1.601229e+12	1.661723e+12	1.732352e+12
Australia	8.618533e+11	9.329891e+11	9.795580e+11	1.001500e+12	1.031945e+12
Canada	1.362091e+12	1.427541e+12	1.469441e+12	1.512973e+12	1.565813e+12
Turkey	1.168150e+12	1.308344e+12	1.348311e+12	1.409344e+12	1.457863e+12
UAE	4.684941e+11	5.030687e+11	5.474020e+11	5.795663e+11	6.148966e+11
Spain	1.506787e+12	1.520544e+12	1.514893e+12	1.516434e+12	1.541156e+12
Israel	2.206057e+11	2.374335e+11	2.525388e+11	2.635355e+11	2.729914e+11

```
In [89]: #draw the plots of the GDP vs milex
countries=['Australia', 'Brazil', 'Canada', 'China, P. R.', 'France', 'Germany', 'India', 'Israel', 'Italy', 'Japan', 'Korea, South', 'Russia/USSR', 'Saudi Arabia', 'Spain', 'Turkey', 'UAE', 'UK', 'USA']
for country in countries:
    data=milex.loc[country]
    pp.figure(figsize=(10,5))
    pp.title(country)
    pp.subplot(2,1,1)
    pp.ticklabel_format(useOffset=False)
    pp.plot(data.index,data.values)
    pp.legend('milex')
    pp.title(country)
    data2=GDP_PPP.loc[country]
    pp.subplot(2,1,2)
    pp.ticklabel_format(useOffset=False)
    pp.plot(data2.index,data2.values)
    pp.legend('GDP')
    pp.show()
```

```
In [28]: #The growth of milex
growth2010 =pd.read_csv(r'C:\Users\Student\Desktop\2010milex.csv').
set_index('country')
growth2011 =pd.read_csv(r'C:\Users\Student\Desktop\2011milex.csv').
set_index('country')
growth2012 =pd.read_csv(r'C:\Users\Student\Desktop\2012milex.csv').
set_index('country')
growth2013 =pd.read_csv(r'C:\Users\Student\Desktop\2013milex.csv').
set_index('country')
growth2014 =pd.read_csv(r'C:\Users\Student\Desktop\2014milex.csv').
set_index('country')
growth=pd.concat([growth2010,growth2011,growth2012,growth2013,growth2014],keys=['2010','2011','2012','2013','2014'],join='inner',axis=1)
growth.columns=['2010','2011','2012','2013','2014']
growth['2010-2011']=(growth['2011']-growth['2010'])/growth['2010']
growth['2011-2012']=(growth['2012']-growth['2011'])/growth['2011']
growth['2012-2013']=(growth['2013']-growth['2012'])/growth['2012']
growth['2013-2014']=(growth['2014']-growth['2013'])/growth['2013']
growth['2010-2014']=(growth['2014']-growth['2010'])/growth['2010']
growth
```

Out[28]:

	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013
country								
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09


```

In [9]: GDPgrowth=GDP_PPP.copy()
GDPgrowth['2010-2011']=(GDPgrowth['2011']-GDPgrowth['2010'])/GDPgrowth['2010']
GDPgrowth['2011-2012']=(GDPgrowth['2012']-GDPgrowth['2011'])/GDPgrowth['2011']
GDPgrowth['2012-2013']=(GDPgrowth['2013']-GDPgrowth['2012'])/GDPgrowth['2012']
GDPgrowth['2013-2014']=(GDPgrowth['2014']-GDPgrowth['2013'])/GDPgrowth['2013']
GDPgrowth['2010-2014']=(GDPgrowth['2014']-GDPgrowth['2010'])/GDPgrowth['2010']
GDPgrowth

```

Out[9]:

	2010	2011	2012	2013	2014
country					
USA	1.496437e+13	1.551793e+13	1.616316e+13	1.676805e+13	1.741900e+13
China, P. R.	1.235873e+13	1.381026e+13	1.514773e+13	1.655471e+13	1.801707e+13
France	2.332312e+12	2.438939e+12	2.445463e+12	2.478251e+12	2.571970e+12
Russia/USSR	2.928122e+12	3.226600e+12	3.445923e+12	3.592401e+12	3.745157e+12
UK	2.250494e+12	2.314654e+12	2.395635e+12	2.483661e+12	2.565070e+12
Japan	4.321149e+12	4.386152e+12	4.540945e+12	4.612630e+12	4.630941e+12
Germany	3.239361e+12	3.447162e+12	3.506642e+12	3.553605e+12	3.704911e+12
India	5.370599e+12	5.845362e+12	6.252659e+12	6.783639e+12	7.384099e+12
Saudi Arabia	1.217779e+12	1.366704e+12	1.466150e+12	1.527724e+12	1.603764e+12
Italy	2.057881e+12	2.131797e+12	2.114542e+12	2.109334e+12	2.128762e+12
Brazil	2.803888e+12	2.973856e+12	3.080598e+12	3.212283e+12	3.263867e+12
Korea, South	1.505299e+12	1.559447e+12	1.601229e+12	1.661723e+12	1.732352e+12
Australia	8.618533e+11	9.329891e+11	9.795580e+11	1.001500e+12	1.031945e+12
Canada	1.362091e+12	1.427541e+12	1.469441e+12	1.512973e+12	1.565813e+12
Turkey	1.168150e+12	1.308344e+12	1.348311e+12	1.409344e+12	1.457863e+12
UAE	4.684941e+11	5.030687e+11	5.474020e+11	5.795663e+11	6.148966e+11
Spain	1.506787e+12	1.520544e+12	1.514893e+12	1.516434e+12	1.541156e+12
Israel	2.206057e+11	2.374335e+11	2.525388e+11	2.635355e+11	2.729914e+11

```
In [74]: GDP_grow2011=GDPgrowth['2010-2011'].copy()
growth2011=growth['2010-2011'].copy()
a=pd.DataFrame({'milex':growth2011,'GDP':GDP_grow2011})
pp.figure(figsize=(12,12))
data1=a['GDP']
data2=a['milex']
N=len(data1)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X, data1.values,facecolor='#ff9999')
pp.xticks(X+0.8/2,data1.index)
pp.title('2010-2011 growth rate of GDP')
pp.subplot(2,1,2)
pp.bar(X, data2.values,facecolor='#9999ff')
pp.title('2010-2011 growth rate of milex')
pp.xticks(X+0.8/2,data1.index)
pp.show()
```

```
In [23]: GDP_grow2012=GDPgrowth['2011-2012'].copy()
growth2012=growth['2011-2012'].copy()

a=pd.DataFrame({'milex':growth2012,'GDP':GDP_grow2012})
pp.figure(figsize=(12,12))
data1=a['GDP']
data2=a['milex']
N=len(data1)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X, data1.values,facecolor='#ff9999')
pp.xticks(X+0.8/2,data1.index)
pp.title('2011-2012 growth rate of GDP')
pp.subplot(2,1,2)
pp.bar(X, data2.values,facecolor='#9999ff')
pp.title('2011-2012 growth rate of milex')
pp.xticks(X+0.8/2,data1.index)
pp.show()
```

```
In [25]: GDP_grow2013=GDPgrowth['2012-2013'].copy()
growth2013=growth['2012-2013'].copy()

a=pd.DataFrame({'milex':growth2013,'GDP':GDP_grow2013})
pp.figure(figsize=(12,12))
data1=a['GDP']
data2=a['milex']
N=len(data1)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X, data1.values,facecolor='#ff9999')
pp.xticks(X+0.8/2,data1.index)
pp.title('2012-2013 growth rate of GDP')
pp.subplot(2,1,2)
pp.bar(X, data2.values,facecolor='#9999ff')
pp.title('2012-2013 growth rate of milex')
pp.xticks(X+0.8/2,data1.index)
pp.show()
```

```
In [26]: GDP_grow2014=GDPgrowth['2013-2014'].copy()
growth2014=growth['2013-2014'].copy()

a=pd.DataFrame({'milex':growth2014,'GDP':GDP_grow2014})
pp.figure(figsize=(12,12))
data1=a['GDP']
data2=a['milex']
N=len(data1)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X, data1.values,facecolor='#ff9999')
pp.xticks(X+0.8/2,data1.index)
pp.title('2013-2014 growth rate of GDP')
pp.subplot(2,1,2)
pp.bar(X, data2.values,facecolor='#9999ff')
pp.title('2013-2014 growth rate of milex')
pp.xticks(X+0.8/2,data1.index)
pp.show()
```

```
In [32]: GDP_growtotal=GDPgrowth['2010-2014'].copy()
growthtotal=growth['2010-2014'].copy()
a=pd.DataFrame({'milex':growthtotal,'GDP':GDP_growtotal})
pp.figure(figsize=(12,12))
data1=a['GDP']
data2=a['milex']
N=len(data1)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X, data1.values,facecolor='#ff9999')
pp.xticks(X+0.8/2,data1.index)
pp.title('2010-2014 growth rate of GDP')
pp.subplot(2,1,2)
pp.bar(X, data2.values,facecolor='#9999ff')
pp.title('2010-2014 growth rate of milex')
pp.xticks(X+0.8/2,data1.index)
pp.show()
```

```
In [33]: totalmilex2010=sum(growth['2010'])
totalmilex2011=sum(growth['2011'])
totalmilex2012=sum(growth['2012'])
totalmilex2013=sum(growth['2013'])
totalmilex2014=sum(growth['2014'])
```

```
In [34]: totalmilex=pd.Series({'2010':totalmilex2010,'2011':totalmilex2011,
'2012':totalmilex2012,'2013':totalmilex2013,'2014':totalmilex2014})
totalmilex
```

```
Out[34]: 2010    1396269
2011    1479267
2012    1475667
2013    1464504
2014    1472685
dtype: int64
```

```
In [35]: percentage=growth.copy()
```

```
In [36]: years=totalmilex.index
for year in years:
    percentage[year]=percentage[year]/totalmilex[year]
percentage
```

Out[36]:

	2010	2011	2012	2013	2014	2010-2011	2011-2012
country							
USA	0.500033	0.480872	0.464048	0.436806	0.414151	0.018846	-0.0373
China, P. R.	0.088330	0.099548	0.114934	0.130575	0.146923	0.193987	0.15174
Russia/USSR	0.042055	0.047481	0.054944	0.059973	0.057352	0.196134	0.15436
Saudi Arabia	0.032404	0.032807	0.038286	0.045763	0.054840	0.072627	0.16416
France	0.044248	0.043671	0.040683	0.042620	0.042296	0.045628	-0.0706
UK	0.041599	0.040743	0.039640	0.038826	0.041069	0.037653	-0.0294
India	0.033009	0.033553	0.031997	0.032368	0.033930	0.076893	-0.0486
Germany	0.033128	0.032543	0.031492	0.032548	0.031544	0.040730	-0.0346
Japan	0.038528	0.040866	0.040666	0.033273	0.031083	0.123727	-0.0073
Korea, South	0.019748	0.020878	0.021455	0.023175	0.024905	0.120081	0.02515
Brazil	0.024353	0.024969	0.023032	0.022505	0.021555	0.086257	-0.0798
Italy	0.025806	0.025776	0.022859	0.023142	0.020988	0.058226	-0.1153
Australia	0.016629	0.017980	0.017766	0.016951	0.017255	0.145534	-0.0142
UAE	0.012537	0.012967	0.012892	0.016088	0.015451	0.095801	-0.0082
Turkey	0.012712	0.011580	0.012069	0.012585	0.015358	-0.034875	0.03968
Canada	0.013834	0.013847	0.013807	0.012608	0.011850	0.060416	-0.0052
Israel	0.010489	0.010465	0.010001	0.011585	0.010802	0.057084	-0.0467
Spain	0.010559	0.009453	0.009428	0.008608	0.008645	-0.051550	-0.0050

```
In [94]: labels='USA','China, P. R.','Russia/USSR', 'Saudi Arabia','France', 'UK', 'India', 'Germany', 'Japan', 'Korea, South', 'Brazil', 'Italy', 'Australia', 'UAE', 'Turkey', 'Canada', 'Israel', 'Spain'
years=['2010', '2011', '2012', '2013', '2014']
for year in years:
    sizes=percentage[year]
    colors=['#FFFFCC', '#CCFFFF', '#FFCCCC', '#99CCCC', '#FFCC99', '#FF9999', '#996699', '#CC9999', '#CCCC99', '#CCCCFF', '#0099CC', '#CCCCCC', '#FF6666', '#FF9966', '#CC9966', '#666666', '#FFFF66', '#99CC66']
    pp.pie(sizes, labels=labels, colors=colors)
    pp.title('The percentage of every country'+ ' in'+ ' ' + year)
    pp.show()
```

```
In [40]: GDP_per=pd.read_csv(r'C:\Users\Student\Desktop\GDP_per.csv').set_index('country')
milexper=pd.read_csv(r'C:\Users\Student\Desktop\milexper.csv').set_index('country')
```

In [41]: GDP_per

Out[41]:

	2010	2011	2012	2013	2014
country					
USA	48374.056460	49781.357490	51456.658730	52980.043630	54629.495
China, P. R.	4514.940520	5574.187093	6264.643878	6991.853866	7590.0164
France	40705.766230	43807.475900	40850.352370	42627.652440	42732.566
Russia/USSR	10674.997200	13323.883380	14078.830570	14487.279870	12735.918
UK	38292.871130	41020.376960	41294.514800	42309.039920	46331.977
Japan	42909.234150	46203.709520	46679.265430	38633.708060	36194.415
Germany	41788.044790	45936.081260	44010.931390	46441.677130	47821.917
India	1387.880084	1471.658439	1449.664875	1455.102191	1581.5107
Saudi Arabia	18753.981230	23256.095610	24883.189710	24646.020870	24160.958
Italy	35877.871930	38364.942670	34844.498090	35420.877610	34908.500
Brazil	11124.245780	13042.421930	11922.513060	11711.004400	11384.415
Korea, South	22151.208890	24155.829850	24453.971910	25997.881050	27970.495
Australia	51845.654860	62216.547130	67646.103850	67627.773330	61925.496
Canada	47463.631190	52086.533520	52733.473690	52305.258390	50235.385
Turkey	10111.517710	10584.163960	10646.035530	10975.074930	10515.007
UAE	34341.911290	39901.220920	41712.124210	42831.089130	43962.713
Spain	30737.832270	31832.238080	28647.835240	29370.663870	29767.351
Israel	30736.363890	33707.324960	32818.858380	36281.199900	37207.994

In [43]: milexper

Out[43]:

	2010	2011	2012	2013	2014
country					
USA	2257.0	2283.0	2182.0	2024.0	1891.0
China, P. R.	92.2	110.0	126.0	141.0	155.0
France	950.0	989.0	914.0	945.0	964.0
Russia/USSR	412.0	491.0	566.0	612.0	593.0
UK	925.0	953.0	918.0	887.0	952.0
Japan	422.0	473.0	470.0	383.0	360.0
Germany	566.0	589.0	578.0	591.0	562.0
India	38.2	40.6	38.2	37.9	39.4
Saudi Arabia	1660.0	1748.0	1997.0	2325.0	2747.0
Italy	608.0	642.0	567.0	566.0	506.0
Brazil	174.0	188.0	171.0	164.0	157.0
Korea, South	558.0	620.0	633.0	676.0	741.0
Australia	1054.0	1191.0	1154.0	1073.0	1077.0
Canada	568.0	596.0	586.0	525.0	492.0
Turkey	246.0	234.0	241.0	246.0	298.0
UAE	2074.0	2149.0	2067.0	2521.0	2421.0
Spain	317.0	299.0	298.0	270.0	270.0
Israel	1921.0	1993.0	1866.0	2105.0	2040.0


```
In [44]: perper=milexper/GDP_per
perper
```

```
Out[44]:
```

	2010	2011	2012	2013	2014
country					
USA	0.046657	0.045861	0.042405	0.038203	0.034615
China, P. R.	0.020421	0.019734	0.020113	0.020166	0.020422
France	0.023338	0.022576	0.022374	0.022169	0.022559
Russia/USSR	0.038595	0.036851	0.040202	0.042244	0.046561
UK	0.024156	0.023232	0.022231	0.020965	0.020547
Japan	0.009835	0.010237	0.010069	0.009914	0.009946
Germany	0.013545	0.012822	0.013133	0.012726	0.011752
India	0.027524	0.027588	0.026351	0.026046	0.024913
Saudi Arabia	0.088515	0.075163	0.080255	0.094336	0.113696
Italy	0.016946	0.016734	0.016272	0.015979	0.014495
Brazil	0.015642	0.014415	0.014343	0.014004	0.013791
Korea, South	0.025190	0.025667	0.025885	0.026002	0.026492
Australia	0.020330	0.019143	0.017059	0.015866	0.017392
Canada	0.011967	0.011442	0.011112	0.010037	0.009794
Turkey	0.024329	0.022109	0.022638	0.022414	0.028340
UAE	0.060393	0.053858	0.049554	0.058859	0.055069
Spain	0.010313	0.009393	0.010402	0.009193	0.009070
Israel	0.062499	0.059127	0.056858	0.058019	0.054827

```
In [90]: labels=['USA','China, P. R.','Russia/USSR','Saudi Arabia','France']
labels2=['UK','India','Germany','Japan','Korea, South']
labels3=['Brazil','Italy','Australia','UAE']
labels4=['Turkey','Canada','Israel','Spain']
pp.figure(figsize=(12,15))
for label in labels:
    data=perper.loc[label]
    pp.plot(data.index,data.values)
pp.legend(labels)
pp.title('The per-capita milex percentage on the per-capita GDP for
the top 5 counties in the GDP ranking')
pp.ticklabel_format(useOffset=False)
pp.show()
```

```
In [91]: pp.figure(figsize=(12,15))
        for label in labels2:
            data=perper.loc[label]
            pp.plot(data.index,data.values)
        pp.legend(labels2)
        pp.title('The per-capita milex percentage on the per-capita GDP for
the top 6-10 counties in the GDP ranking')
        pp.ticklabel_format(useOffset=False)
        pp.show()
```

```
In [92]: pp.figure(figsize=(12,15))
        for label in labels3:
            data=perper.loc[label]
            pp.plot(data.index,data.values)
        pp.legend(labels3)
        pp.title('The per-capita milex percentage on the per-capita GDP for
the top 11-14 counties in the GDP ranking')
        pp.ticklabel_format(useOffset=False)
        pp.show()
```

```
In [93]: pp.figure(figsize=(12,15))
        for label in labels4:
            data=perper.loc[label]
            pp.plot(data.index,data.values)
        pp.legend(labels4)
        pp.title('The per-capita milex percentage on the per-capita GDP for
the top 15-18 counties in the GDP ranking')
        pp.show()
```

```
In [54]: GDP_per['avg']=(GDP_per['2010']+GDP_per['2011']+GDP_per['2012']+GDP_per['2013']+GDP_per['2014'])/5
GDP_per
```

```
Out[54]:
```

	2010	2011	2012	2013	2014
country					
USA	48374.056460	49781.357490	51456.658730	52980.043630	54629.495
China, P. R.	4514.940520	5574.187093	6264.643878	6991.853866	7590.0164
France	40705.766230	43807.475900	40850.352370	42627.652440	42732.566
Russia/USSR	10674.997200	13323.883380	14078.830570	14487.279870	12735.918
UK	38292.871130	41020.376960	41294.514800	42309.039920	46331.977
Japan	42909.234150	46203.709520	46679.265430	38633.708060	36194.415
Germany	41788.044790	45936.081260	44010.931390	46441.677130	47821.917
India	1387.880084	1471.658439	1449.664875	1455.102191	1581.5107
Saudi Arabia	18753.981230	23256.095610	24883.189710	24646.020870	24160.958
Italy	35877.871930	38364.942670	34844.498090	35420.877610	34908.500
Brazil	11124.245780	13042.421930	11922.513060	11711.004400	11384.415
Korea, South	22151.208890	24155.829850	24453.971910	25997.881050	27970.495
Australia	51845.654860	62216.547130	67646.103850	67627.773330	61925.496
Canada	47463.631190	52086.533520	52733.473690	52305.258390	50235.385
Turkey	10111.517710	10584.163960	10646.035530	10975.074930	10515.007
UAE	34341.911290	39901.220920	41712.124210	42831.089130	43962.713
Spain	30737.832270	31832.238080	28647.835240	29370.663870	29767.351
Israel	30736.363890	33707.324960	32818.858380	36281.199900	37207.994

```
In [55]: milexper['avg']=(milexper['2010']+milexper['2011']+milexper['2012']
+milexper['2013']+milexper['2014'])/5
milexper
```

Out[55]:

	2010	2011	2012	2013	2014	avg
country						
USA	2257.0	2283.0	2182.0	2024.0	1891.0	2127.40
China, P. R.	92.2	110.0	126.0	141.0	155.0	124.84
France	950.0	989.0	914.0	945.0	964.0	952.40
Russia/USSR	412.0	491.0	566.0	612.0	593.0	534.80
UK	925.0	953.0	918.0	887.0	952.0	927.00
Japan	422.0	473.0	470.0	383.0	360.0	421.60
Germany	566.0	589.0	578.0	591.0	562.0	577.20
India	38.2	40.6	38.2	37.9	39.4	38.86
Saudi Arabia	1660.0	1748.0	1997.0	2325.0	2747.0	2095.40
Italy	608.0	642.0	567.0	566.0	506.0	577.80
Brazil	174.0	188.0	171.0	164.0	157.0	170.80
Korea, South	558.0	620.0	633.0	676.0	741.0	645.60
Australia	1054.0	1191.0	1154.0	1073.0	1077.0	1109.80
Canada	568.0	596.0	586.0	525.0	492.0	553.40
Turkey	246.0	234.0	241.0	246.0	298.0	253.00
UAE	2074.0	2149.0	2067.0	2521.0	2421.0	2246.40
Spain	317.0	299.0	298.0	270.0	270.0	290.80
Israel	1921.0	1993.0	1866.0	2105.0	2040.0	1985.00

```
In [56]: GDP_per_avg=GDP_per['avg']
milex_per_avg=milexper['avg']
```

```
In [57]: per=pd.DataFrame({'GDP':GDP_per_avg,'milex':milex_per_avg})
```

In [58]: per

Out[58]:

	GDP	milex
country		
USA	51444.322296	2127.40
China, P. R.	6187.128360	124.84
France	42144.762688	952.40
Russia/USSR	13060.181884	534.80
UK	41849.756044	927.00
Japan	42124.066554	421.60
Germany	45199.730406	577.20
India	1469.163258	38.86
Saudi Arabia	23140.049192	2095.40
Italy	35883.338254	577.80
Brazil	11836.920036	170.80
Korea, South	24945.877370	645.60
Australia	62252.315046	1109.80
Canada	50964.856460	553.40
Turkey	10566.359990	253.00
UAE	40549.811848	2246.40
Spain	30071.184204	290.80
Israel	34150.348326	1985.00

```
In [59]: pp.figure(figsize=(12,10))
N=len(GDP_per_avg)
X=np.arange(1,N+1)
pp.subplot(2,1,1)
pp.bar(X,GDP_per_avg.values,color='#ff9999')
pp.xticks(X+0.8/2,GDP_per_avg.index)
pp.title('The average of per-capita GDP from 2010 to 2015')
M=len(milex_per_avg)
Y=np.arange(1,M+1)
pp.subplot(2,1,2)
pp.bar(Y,milex_per_avg.values,color='#9999ff')
pp.xticks(Y+0.8/2,milex_per_avg.index)
pp.title('The average of per-capita milex from 2010 to 2015')
pp.show()
```

```
In [69]: growth.sort('2010-2014',ascending=False)
```

```
C:\Users\Student\Anaconda3\lib\site-packages\ipykernel\__main__.py:1: FutureWarning: sort(columns=....) is deprecated, use sort_values(by=.....)
  if __name__ == '__main__':
```

```
Out[69]:
```

	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013
country								
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18

```
In [68]: growth.sort('2010-2011',ascending=False)
```

```
C:\Users\Student\Anaconda3\lib\site-packages\ipykernel\__main__.py:1: FutureWarning: sort(columns=....) is deprecated, use sort_values(by=.....)
  if __name__ == '__main__':
```

```
Out[68]:
```

	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013
country								
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09

```
In [66]: growth.sort('2011-2012',ascending=False)
```

```
C:\Users\Student\Anaconda3\lib\site-packages\ipykernel\__main__.py:1: FutureWarning: sort(columns=....) is deprecated, use sort_values(by=.....)
  if __name__ == '__main__':
```

```
Out[66]:
```

	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013
country								
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004


```
In [70]: growth.sort('2012-2013',ascending=False)
```

```
C:\Users\Student\Anaconda3\lib\site-packages\ipykernel\__main__.p
y:1: FutureWarning: sort(columns=....) is deprecated, use sort_val
ues(by=.....)
    if __name__ == '__main__':
```

```
Out[70]:
```

	2010	2011	2012	2013	2014	2010- 2011	2011- 2012	2012- 2013
country								
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18

In [73]: `growth.sort('2013-2014',ascending=False)`

```
C:\Users\Student\Anaconda3\lib\site-packages\ipykernel\__main__.py:1: FutureWarning: sort(columns=....) is deprecated, use sort_values(by=.....)
  if __name__ == '__main__':
```

Out[73]:

	2010	2011	2012	2013	2014	2010-2011	2011-2012	2012-2013
country								
Turkey	17749	17130	17810	18431	22618	-0.034875	0.039696	0.034
Saudi Arabia	45245	48531	56498	67020	80762	0.072627	0.164163	0.186
China, P. R.	123333	147258	169604	191228	216371	0.193987	0.151747	0.127
Korea, South	27573	30884	31661	33940	36677	0.120081	0.025159	0.071
UK	58083	60270	58496	56861	60482	0.037653	-0.029434	-0.02
India	46090	49634	47217	47403	49968	0.076893	-0.048696	0.003
Australia	23218	26597	26217	24825	25411	0.145534	-0.014287	-0.05
Spain	14743	13983	13912	12607	12732	-0.051550	-0.005078	-0.09
France	61782	64601	60035	62417	62289	0.045628	-0.070680	0.039
Germany	46256	48140	46471	47667	46455	0.040730	-0.034670	0.025
UAE	17505	19182	19024	23561	22755	0.095801	-0.008237	0.238
Brazil	34003	36936	33987	32958	31744	0.086257	-0.079841	-0.03
Russia/USSR	58720	70237	81079	87831	84462	0.196134	0.154363	0.083
USA	698180	711338	684780	639704	609914	0.018846	-0.037335	-0.06
Canada	19316	20483	20375	18464	17452	0.060416	-0.005273	-0.09
Japan	53796	60452	60010	48728	45776	0.123727	-0.007312	-0.18
Israel	14645	15481	14758	16967	15908	0.057084	-0.046702	0.149
Italy	36032	38130	33733	33892	30909	0.058226	-0.115316	0.004

In []: