Assingment 2 - MSBA 325

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```
In [ ]:   import matplotlib.pyplot as plt
          import pandas as pd
          from dateutil.parser import *
          from datetime import *
          import numpy as np
          import seaborn as sns
```

Part A

Task 1

```
In [3]:   sales=pd.read_excel(r'C:\Users\user\Desktop\MSBA Spring 2020\MSBA 325\Global Sa
          les Data.xls')
```

```
In [4]:   sales['Order Year']=sales['Order Date'].apply(lambda x:x.year)
```

```
In [6]:   sales_per_year=sales.groupby(['Order Year'],as_index=False)['Sales'].sum()
```
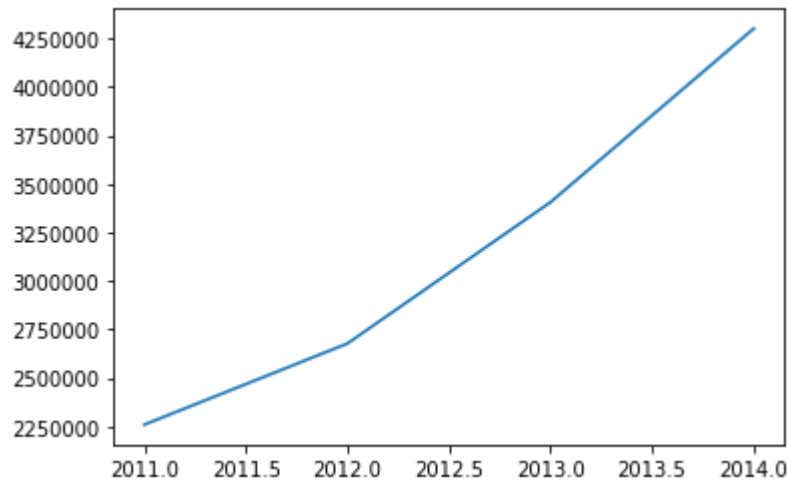
```
In [7]:   sales_per_year
```

Out[7]:

	Order Year	Sales
0	2011	2.259451e+06
1	2012	2.677439e+06
2	2013	3.405746e+06
3	2014	4.299866e+06

```
In [8]: plt.plot(sales_per_year['Order Year'],sales_per_year['Sales'])
```

```
Out[8]: [<matplotlib.lines.Line2D at 0x2095dd78da0>]
```


As shown in the graph, sales have been going up.

```
In [9]: profit_per_category_per_market=sales.groupby(['Sub-Category','Market'],as_inde
        x=False)['Profit'].sum().sort_values(['Profit'],ascending=True)
```

```
In [207]: profit_per_category_per_market.head()
```

Out[207]:

	Sub-Category	Market	Profit
116	Tables	EU	-20998.4235
112	Tables	APAC	-20128.7481
118	Tables	US	-17725.4811
117	Tables	LATAM	-12305.8520
34	Bookcases	US	-3472.5560

It is evident that Tables are not performing well across most of the markets. So, it is recommended to stop shipment of this specific product

In [217]:
```python
plt.subplots(figsize=(20, 10))
plt.xticks(fontsize=15)
#ax.legend(loc='upper left', borderpad=2)
#ax.legend()
g = sns.barplot(x='Sub-Category',y='Profit',hue='Market',data=sales ,palette=
'RdBu')
plt.setp(g.get_legend().get_texts(), fontsize='17')
plt.setp(g.get_legend().get_title(), fontsize='30')
#plt.legend(handlelength='50', handleheight='50')
#g = g.set_ylabel("Profit",fontsize=35)
#g = g.set_xlabel("Sub-Category",fontsize=35)
plt.title('Profit per sub-category per market',fontsize=40)
```

Out[217]: Text(0.5, 1.0, 'Profit per sub-category per market')
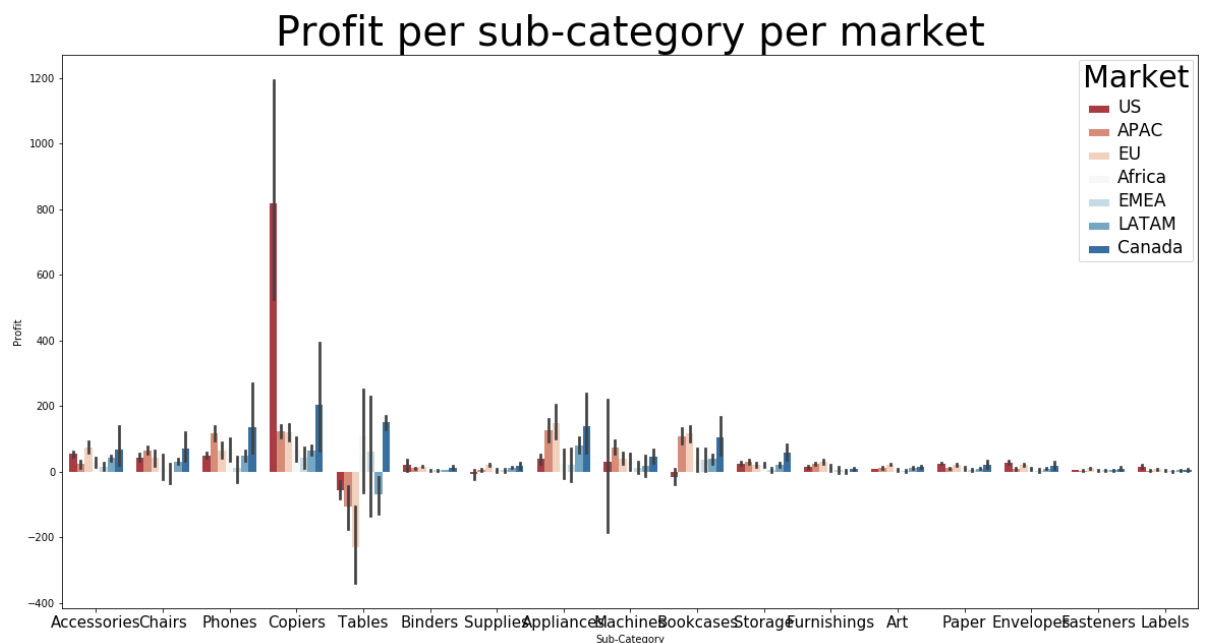
As the barplot shows, tables are generating negative profits across markets. It is wise to stop the production/ciculation of this product so as to avoid further losses.

In [12]:
```python
profit_per_category_per_market_per_segment=sales.groupby(['Sub-Category','Mark
et','Segment'],as_index=False)['Profit'].sum().sort_values(['Profit'],ascendin
g=True)
profit_per_category_per_market_per_segment
```

Out[12]:

	Sub-Category	Market	Segment	Profit
336	Tables	APAC	Corporate	-10338.93720
352	Tables	US	Consumer	-9728.03780
346	Tables	EU	Consumer	-9219.23850
347	Tables	EU	Corporate	-7221.41850
335	Tables	APAC	Consumer	-6247.09650
350	Tables	LATAM	Corporate	-5490.19000
353	Tables	US	Corporate	-4906.49860
348	Tables	EU	Home Office	-4557.76650
349	Tables	LATAM	Consumer	-4507.01200
102	Bookcases	US	Consumer	-4435.63820
337	Tables	APAC	Home Office	-3542.71440
354	Tables	US	Home Office	-3090.94470
282	Phones	EMEA	Corporate	-2952.40200
351	Tables	LATAM	Home Office	-2308.65000
332	Supplies	US	Consumer	-1657.55130
344	Tables	EMEA	Corporate	-1594.78200
110	Chairs	Africa	Home Office	-1486.90800
116	Chairs	EMEA	Home Office	-1175.93400
246	Machines	LATAM	Corporate	-1159.57600
114	Chairs	EMEA	Consumer	-906.09000
32	Appliances	EMEA	Home Office	-737.41800
205	Furnishings	LATAM	Home Office	-273.85400
52	Art	EMEA	Corporate	-242.34000
30	Appliances	EMEA	Consumer	-207.31500
318	Supplies	Africa	Corporate	-130.04400
339	Tables	Africa	Corporate	-97.97700
193	Furnishings	Africa	Corporate	-43.50900
155	Envelopes	Canada	Home Office	7.71000
216	Labels	Canada	Corporate	7.83000
176	Fasteners	Canada	Home Office	9.12000
...	...	...	...	...
36	Appliances	LATAM	Consumer	15145.50000
269	Paper	US	Consumer	15534.64360
274	Phones	APAC	Home Office	15738.12720
142	Copiers	LATAM	Corporate	15968.02936

	Sub-Category	Market	Segment	Profit
128	Copiers	APAC	Home Office	17191.77330
54	Art	EU	Consumer	17427.95400
97	Bookcases	EU	Corporate	17512.97100
81	Binders	US	Consumer	17995.59720
120	Chairs	LATAM	Consumer	18692.85200
33	Appliances	EU	Consumer	18966.77400
141	Copiers	LATAM	Consumer	18980.74796
145	Copiers	US	Corporate	18990.27890
287	Phones	LATAM	Consumer	19188.17600
18	Accessories	US	Consumer	20735.92250
106	Chairs	APAC	Corporate	20876.56680
34	Appliances	EU	Corporate	21260.98200
139	Copiers	EU	Corporate	21272.11950
85	Bookcases	APAC	Corporate	21780.29010
21	Appliances	APAC	Consumer	21861.43020
127	Copiers	APAC	Corporate	22116.06720
290	Phones	US	Consumer	23837.11470
273	Phones	APAC	Corporate	23979.21180
144	Copiers	US	Consumer	24083.71060
284	Phones	EU	Consumer	24954.58800
138	Copiers	EU	Consumer	25334.54100
105	Chairs	APAC	Consumer	29253.05310
96	Bookcases	EU	Consumer	31050.38100
84	Bookcases	APAC	Consumer	35181.07980
126	Copiers	APAC	Consumer	41546.20470
272	Phones	APAC	Consumer	41596.71720

355 rows × 4 columns

```
In [221]: plt.subplots(figsize=(20, 10))
          plt.xticks(fontsize=10)
          #plt.legend(handlelength=50, handleheight=30)
          g = sns.barplot(x='Sub-Category',y='Profit',hue='Segment',data=sales ,palette=
          'RdBu')
          plt.setp(g.get_legend().get_texts(), fontsize='20')
          plt.setp(g.get_legend().get_title(), fontsize='20')
          g = g.set_ylabel("Profit",fontsize='15')
          #g = g.set_xlabel("Sub-Category",fontsize=35)
          plt.title('Profit per sub-category per segment',fontsize=25)
```

Out[221]: Text(0.5, 1.0, 'Profit per sub-category per segment')
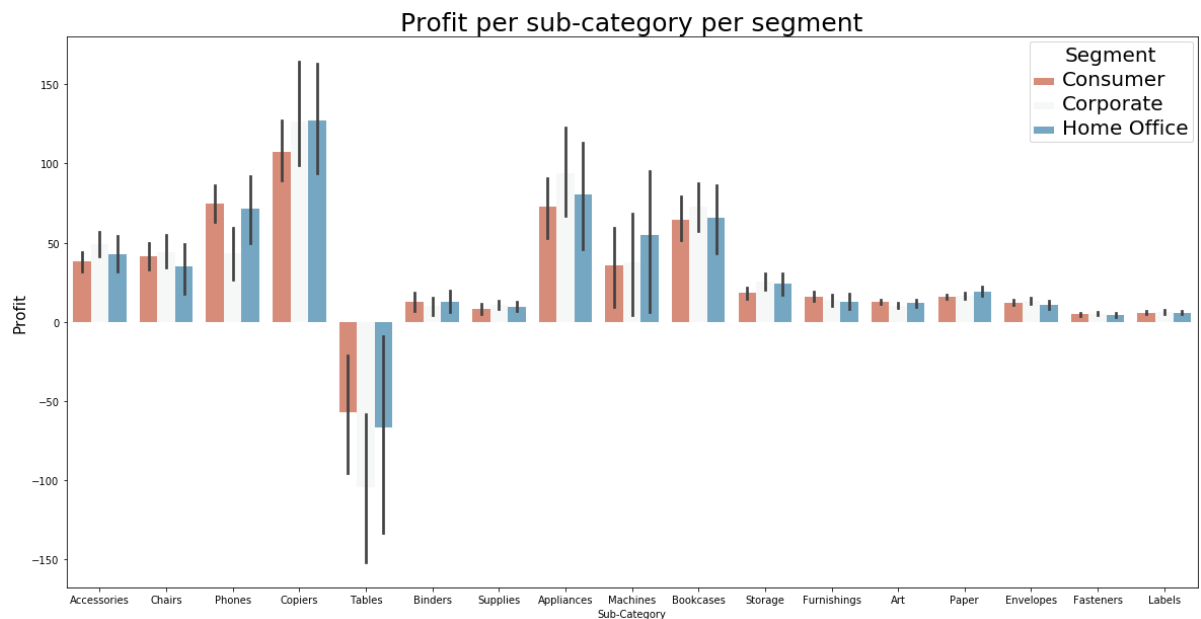
Upon including the market segment in the analysis, we also see that Tables perfrom the worst when it comes to Profit. This does not negate the findings of the previous parts. As tables are generating negative profit across markets and across market segments, it is safe to say that the product in itself is unattractive to customers. It is not a market-specific or segment specific issue, but rather, customers across the board seem to be lacking interest in Tables.

```
In [14]: wdi=pd.read_excel(r'C:\Users\user\Desktop\MSBA Sping 2020\MSBA 325\WDIEXCEL.xl
         sx')
```

The format of the excel as downloaded, is not very handy for analysis. Therefore, it was necessary to create functions to change the orientation and distribution of data to one that can be better used for analysis i.e. columns were changed to be indicators and the indexes are years.

In [17]:
```python
def table(x,y,z):
    newlist=[]
    for i in range(len(y)):
        if y[i]==z:
            newlist.append(x[i])
    return newlist
```

In [18]:
```python
def change_col_names_to_indicator(x):
    new_names=[]
    for idx in x.columns:
        new_names.append(wdi['Indicator Name'][idx])
    return new_names
```

In [19]:
```python
def analysis_tool(country,time):
    years_transposed=wdi[time].T
    a=np.where(wdi['Country Name']==country)
    b=table(years_transposed,wdi['Country Name'],country)
    t=pd.DataFrame(b).T
    t.columns=change_col_names_to_indicator(t)
    t.insert(loc=0, column='Country', value=country)
    return t
```
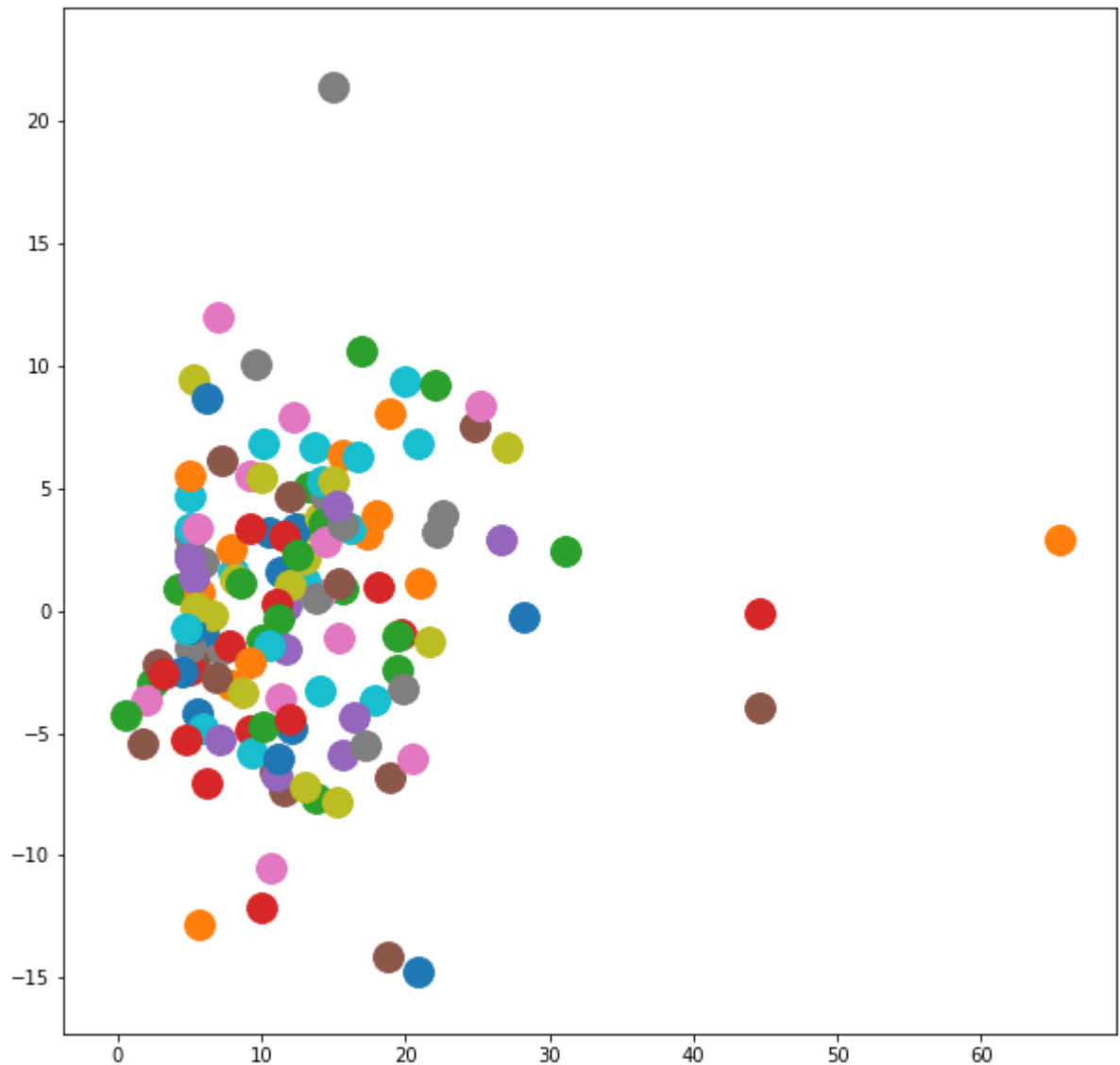
Effect of Lending Rates on 2008 Global Economic Crisis

In [119]:
```python
USA=analysis_tool('United States',['2009'])
Ukraine=analysis_tool('Ukraine',['2009'])
Poland=analysis_tool('Poland',['2009'])
Russia=analysis_tool('Russian Federation',['2009'])
China=analysis_tool('China',['2009'])
Japan=analysis_tool('Japan',['2009'])
France=analysis_tool('France',['2009'])
Jordan=analysis_tool('Jordan',['2009'])
Brazil=analysis_tool('Brazil',['2009'])
UAE=analysis_tool('United Arab Emirates',['2009'])
SouthKorea=analysis_tool('Republic of Korea',['2009'])
```

Did Higher Bank Lending Rates make countries more vulnerable to the economic crisis of 2008?
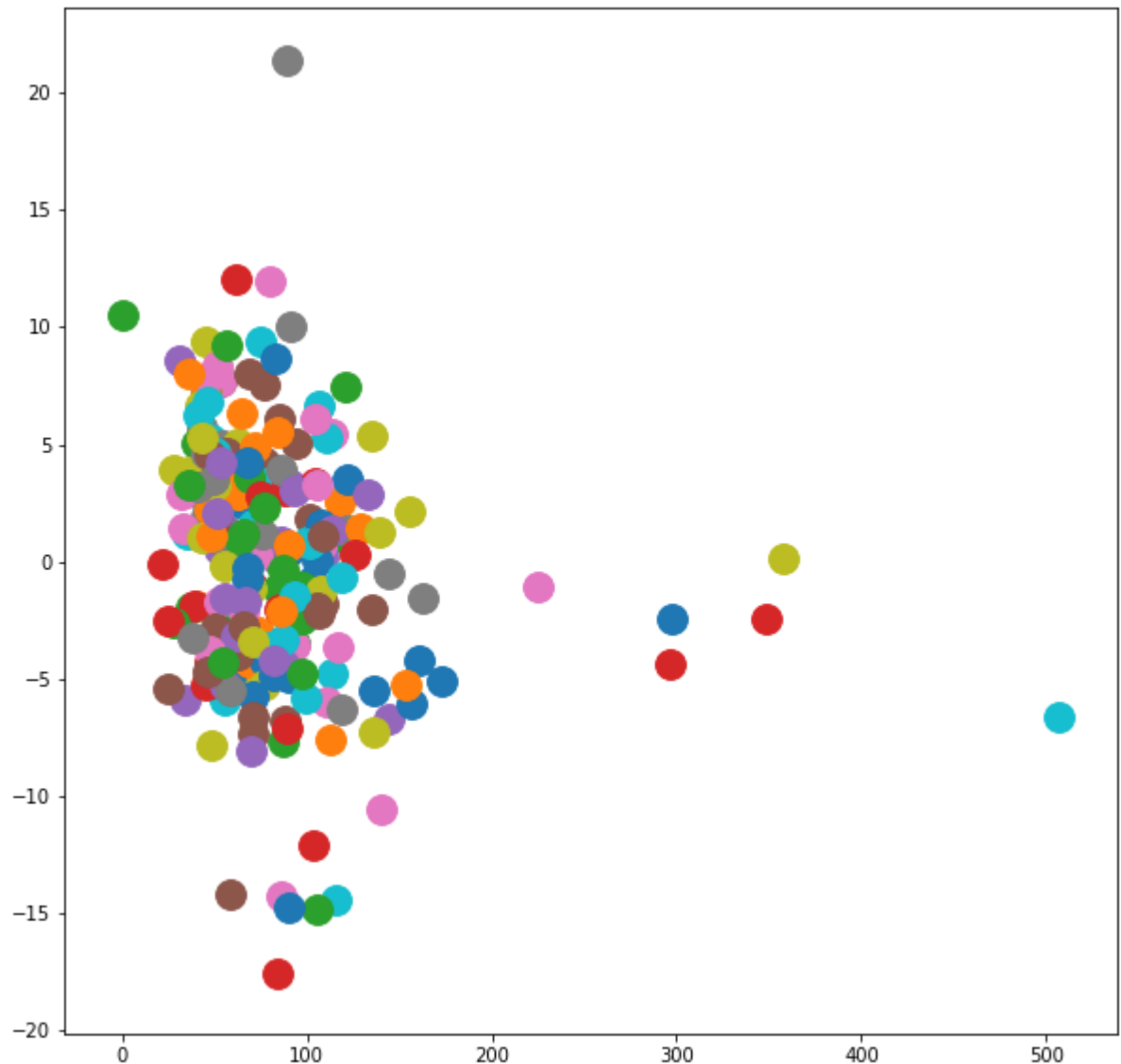
```
In [105]:  plt.subplots(figsize=(10, 10))
           for country in wdi['Country Name'].unique():
               extract_country=analysis_tool(country,['2009'])
               plt.scatter(extract_country['Lending interest rate (%)'],extract_country[
           'GDP growth (annual %)'],label=str(country),s=250)
           #plt.legend(handlelength=5, handleheight=5)
```


Did Trade-centered economies get effected the most?

```
In [106]: plt.subplots(figsize=(10, 10))
          for country in wdi['Country Name'].unique():
              extract_country=analysis_tool(country,['2009'])
              plt.scatter(extract_country['Trade (% of GDP)'],extract_country['GDP growt
          h (annual %)'],label=str(country),s=250)
```


As shown, as the size of Trade in a country with respect to GDP increases, the more likely this country will suffer in the economic crisis it seems. Higher dependecy on the outside proved to be costly in a country relying heavily on trade.

```
In [ ]: USA=analysis_tool('United States',['2009'])
        Ukraine=analysis_tool('Ukraine',['2009'])
        Poland=analysis_tool('Poland',['2009'])
        Russia=analysis_tool('Russian Federation',['2009'])
```

In [225]:
```python
plt.subplots(figsize=(20, 20))
for country in wdi['Country Name'].unique():
    extract_country=analysis_tool(country,['2008','2009'])
    plt.plot(extract_country.index,extract_country['Employment to population r
atio, 15+, male (%) (national estimate)'])
```
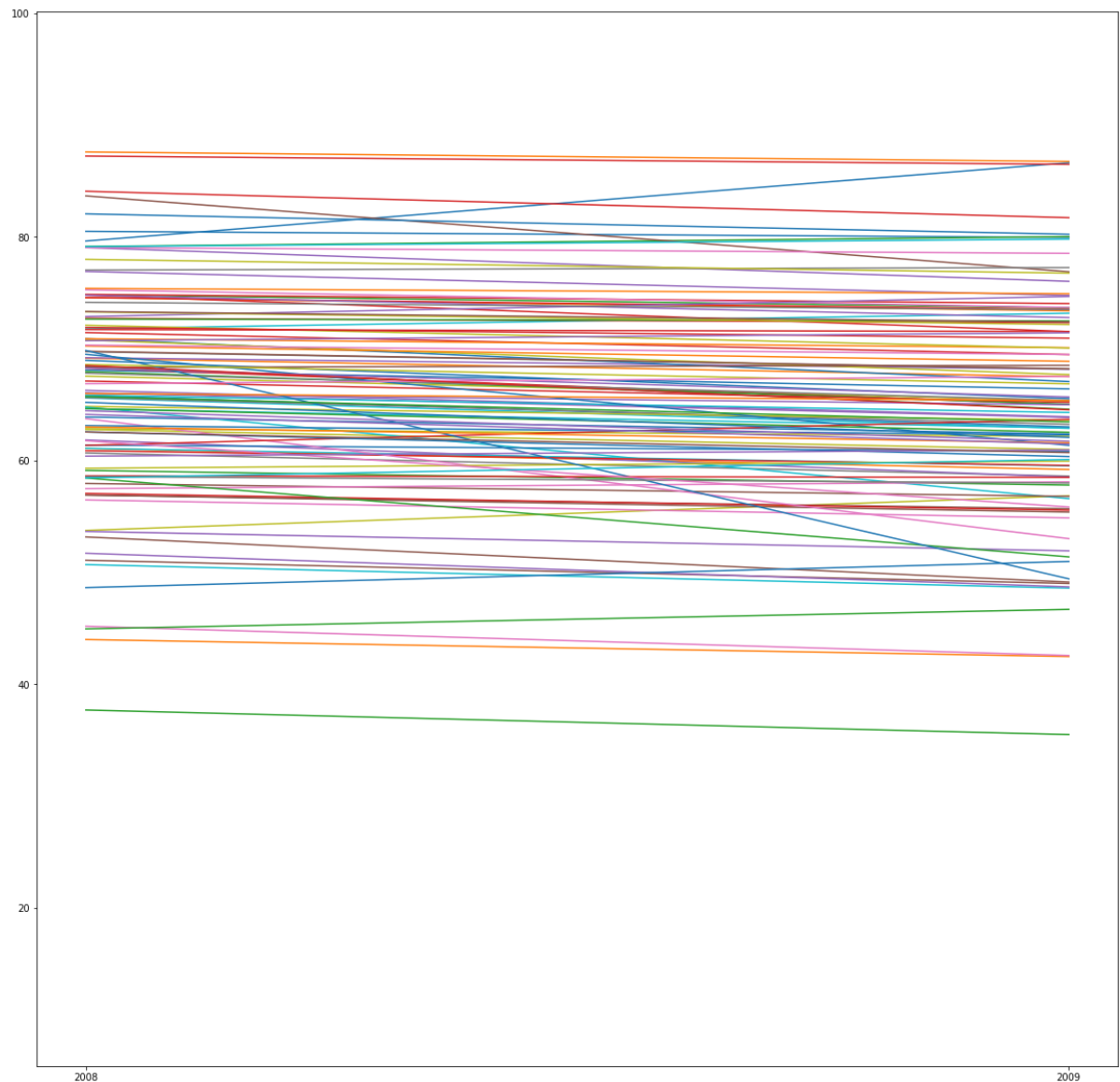

GDP Comparison

In [227]:
```python
France=analysis_tool('France',['1990','1991','1992','1993','1994','1995','199
6','1997','1998','1999','2000','2001','2002','2003','2004','2005','2006','200
7','2008','2009','2010','2011','2012','2013','2014','2015','2016','2017','201
8','2019'])
UK=analysis_tool('United Kingdom',['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'])
Lebanon=analysis_tool('Lebanon',['1990','1991','1992','1993','1994','1995','19
96','1997','1998','1999','2000','2001','2002','2003','2004','2005','2006','200
7','2008','2009','2010','2011','2012','2013','2014','2015','2016','2017','201
8','2019'])
Turkey=analysis_tool('Turkey',['1990','1991','1992','1993','1994','1995','199
6','1997','1998','1999','2000','2001','2002','2003','2004','2005','2006','200
7','2008','2009','2010','2011','2012','2013','2014','2015','2016','2017','201
8','2019'])
UAE=analysis_tool('United Arab Emirates',['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'])
China=analysis_tool('China',['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 [31]:
```python
EU=analysis_tool('European Union',['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'])
ArabWorld=analysis_tool('Arab World',['1990','1991','1992','1993','1994','199
5','1996','1997','1998','1999','2000','2001','2002','2003','2004','2005','200
6','2007','2008','2009','2010','2011','2012','2013','2014','2015','2016','201
7','2018','2019'])
SubSaharanAfrica=analysis_tool('Sub-Saharan Africa (IDA & IBRD countries)',['1
990','1991','1992','1993','1994','1995','1996','1997','1998','1999','2000','20
01','2002','2003','2004','2005','2006','2007','2008','2009','2010','2011','201
2','2013','2014','2015','2016','2017','2018','2019'])
EastAsiaPacific=analysis_tool('East Asia & Pacific',['1990','1991','1992','199
3','1994','1995','1996','1997','1998','1999','2000','2001','2002','2003','200
4','2005','2006','2007','2008','2009','2010','2011','2012','2013','2014','201
5','2016','2017','2018','2019'])
```

In [229]:
```python
plt.subplots(figsize=(20, 10))
plt.plot(France.index,France['GDP (constant 2010 US$)'],label='France')
#plt.plot(Germany.index,Germany['GDP (constant 2010 US$)'],label='Germany')
plt.plot(UK.index,UK['GDP (constant 2010 US$)'],label='UK')
plt.legend(handlelength=5, handleheight=5)
```

Out[229]: <matplotlib.legend.Legend at 0x2090b6ed3c8>
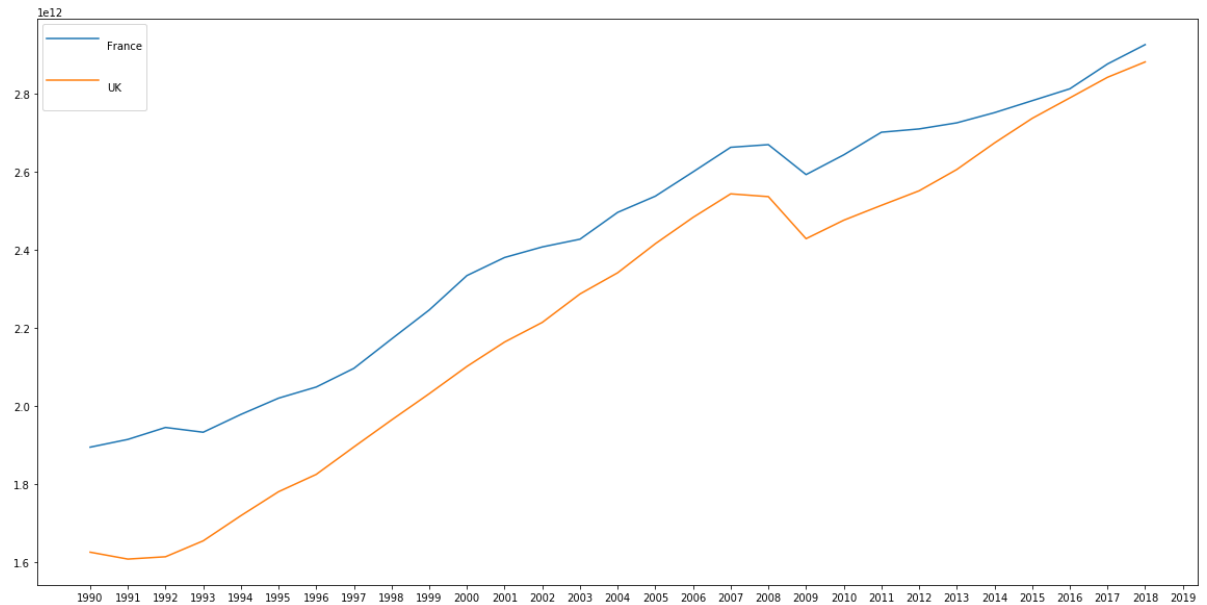
In [234]:
```python
plt.subplots(figsize=(20, 10))
plt.plot(ArabWorld.index,ArabWorld['GDP (constant 2010 US$)'],label='ArabWorld')
plt.plot(EU.index,EU['GDP (constant 2010 US$)'],label='EU')
plt.plot(SubSaharanAfrica.index,SubSaharanAfrica['GDP (constant 2010 US$)'],label='SubSaharanAfrica')
plt.plot(EastAsiaPacific.index,EastAsiaPacific['GDP (constant 2010 US$)'],label='EastAsiaPacific')
plt.legend()
```

Out[234]: <matplotlib.legend.Legend at 0x2090bd1f3c8>
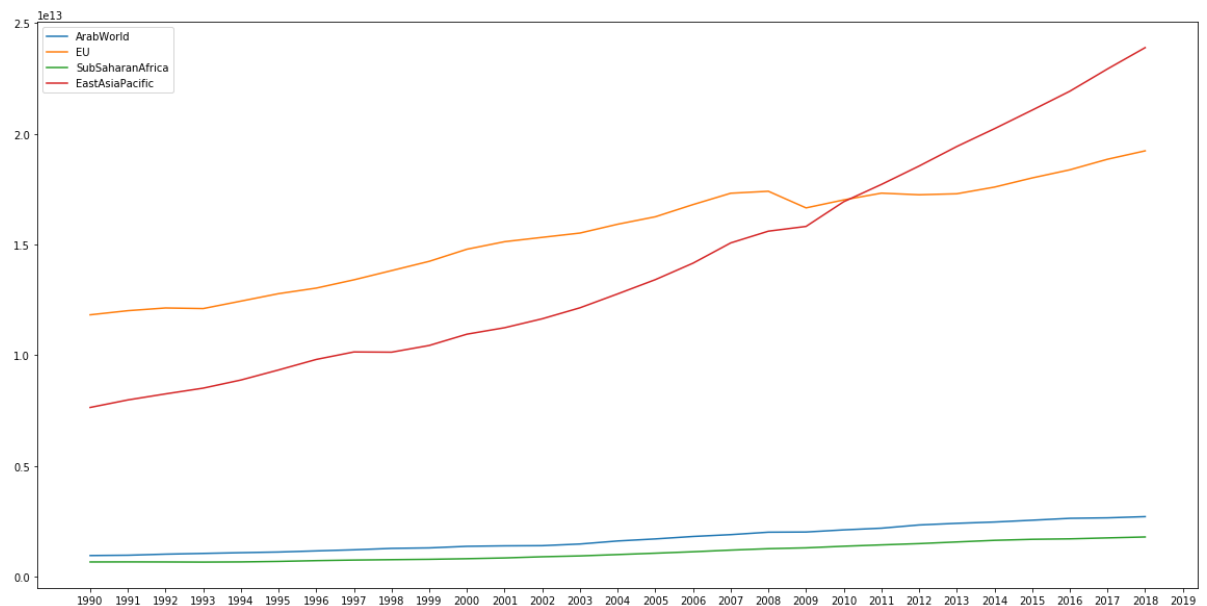
In [231]:
```python
plt.subplots(figsize=(10, 10))
plt.plot(Lebanon['Time required to start a business (days)'],Lebanon['GDP per
 capita growth (annual %)'],label='Lebanon')
plt.plot(France['Time required to start a business (days)'],France['GDP per ca
pita growth (annual %)'],label='France')
#plt.plot(Germany.index,Germany['GDP (constant 2010 US$)'],Label='Germany')
#plt.plot(UK.index,UK['GDP (constant 2010 US$)'],Label='UK')
plt.legend(handlelength=5, handleheight=5)
```

Out[231]:   <matplotlib.legend.Legend at 0x2090ba72ac8>

In [235]:
```python
plt.subplots(figsize=(10, 5))
plt.plot(Lebanon.index,Lebanon['Time required to start a business (days)'],lab
el='Lebanon')
plt.plot(France.index,France['Time required to start a business (days)'],label
='France')
#plt.plot(Germany.index,Germany['GDP (constant 2010 US$)'],Label='Germany')
#plt.plot(UK.index,UK['GDP (constant 2010 US$)'],label='UK')
plt.legend(handlelength=5, handleheight=5)
```

Out[235]: <matplotlib.legend.Legend at 0x2090bda5358>

In [238]:
```python
plt.subplots(figsize=(25, 10))
plt.plot(Lebanon.index,Lebanon['GDP per capita growth (annual %)'],label='GDP
 per Capita')
plt.plot(Lebanon.index,Lebanon['Total debt service (% of GNI)'],label='Debt Se
rvice')
plt.plot(Lebanon.index,Lebanon['Interest rate spread (lending rate minus depos
it rate, %)'],label='Interest Rate Spread')
plt.legend()
```

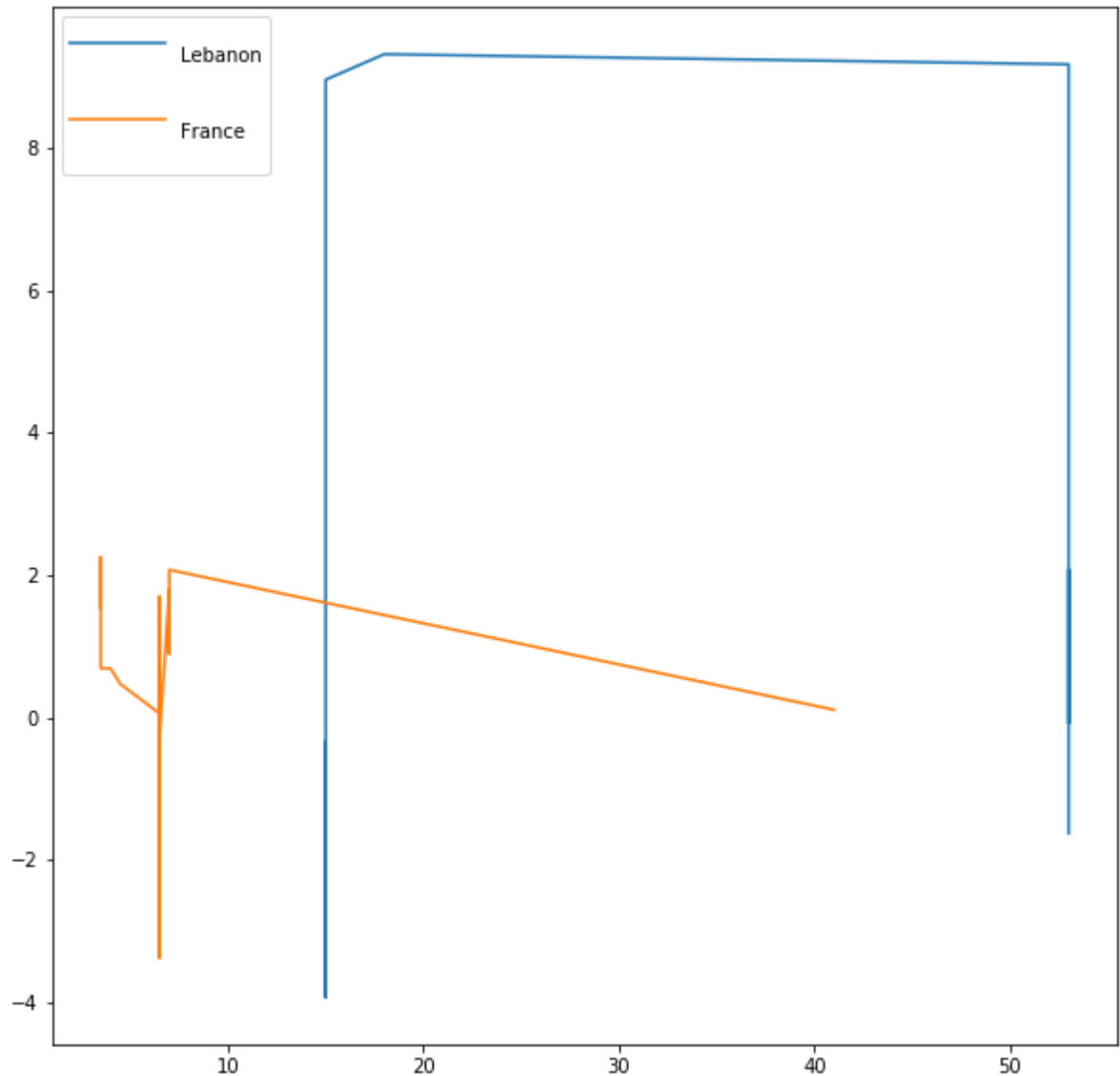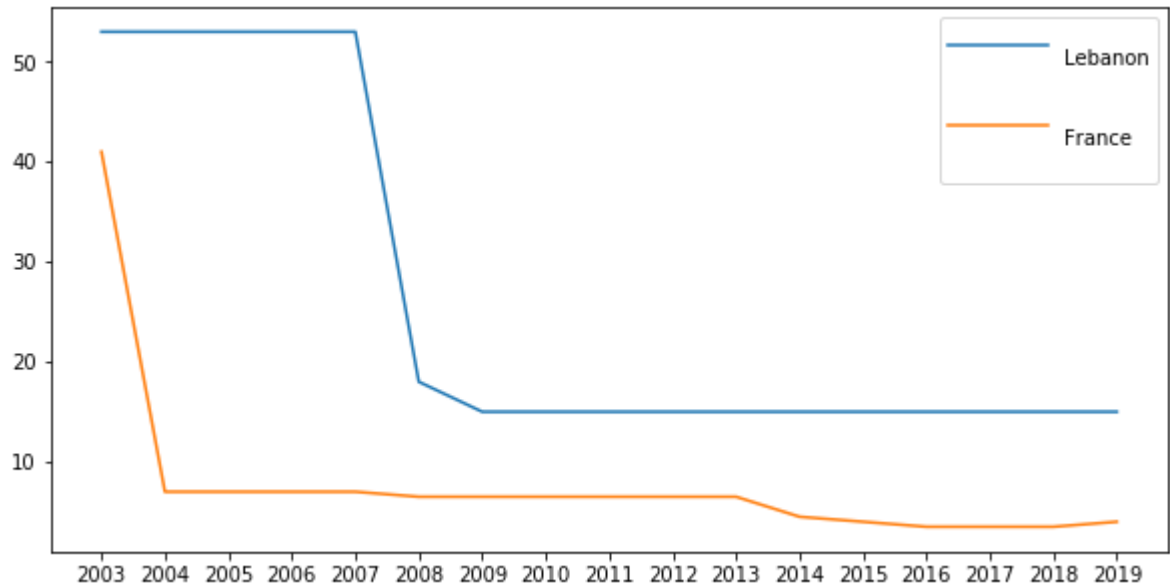Out[238]: <matplotlib.legend.Legend at 0x2090af8cb70>
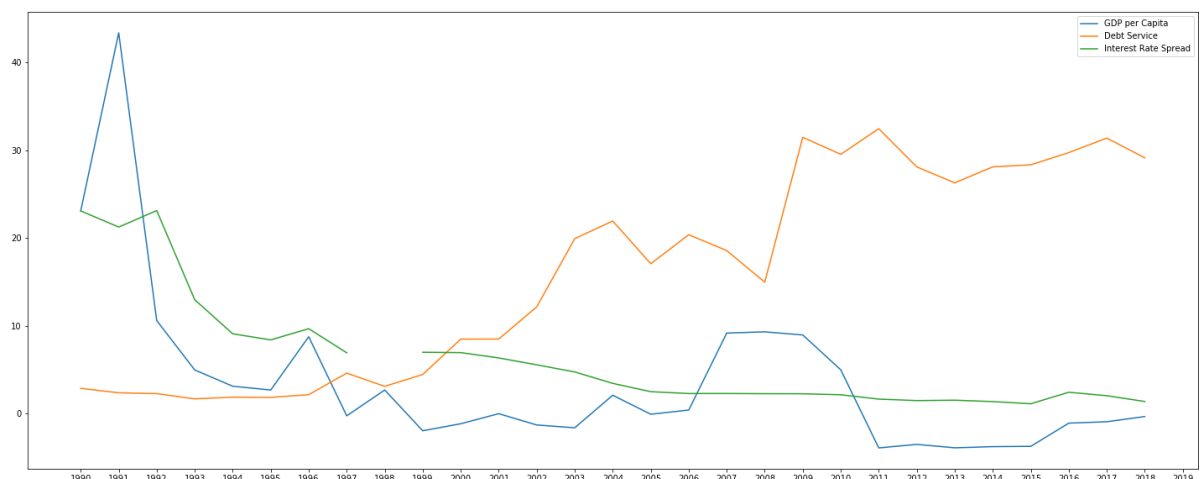
```
In [ ]:  plt.subplots(figsize=(10, 10))
         plt.plot(Lebanon['Time required to start a business (days)'],Lebanon['GDP per
          capita growth (annual %)'],label='Lebanon')
         plt.plot(France['Time required to start a business (days)'],France['GDP per ca
         pita growth (annual %)'],label='France')
```

```
In [98]:  countries=pd.read_excel(r'C:\Users\user\Desktop\MSBA Sping 2020\MSBA 325\count
          ries.xlsx')
```

```
In [99]:  wdi_countries=pd.merge(countries,wdi)
```

```
In [114]:  country_gdp=[]
           for country in wdi['Country Name'].unique():
               extract_country=analysis_tool(country,['2009'])
               country_gdp.append(extract_country['GDP per capita (constant 2010 US$)'])
```

```
In [149]:  #v=np.concatenate(wdi['Country Name'].unique(),list(country_gdp))
           #country_gdp1=country_gdp
           #country_gdp1.name=wdi['Country Name'].unique()
           gdp_per_country=pd.DataFrame(list(zip(wdi['Country Name'].unique(),country_gdp
           )))
```

```
In [156]:  gdp_per_country.columns=['Country Name', 'GDP per capita']
```

```
In [239]: gdp_per_country
```

Out[239]:

	Country Name	GDP per capita
0	Arab World	5810.858675
1	Caribbean small states	9024.068701
2	Central Europe and the Baltics	12335.785838
3	Early-demographic dividend	2812.878745
4	East Asia & Pacific	7215.961452
5	East Asia & Pacific (excluding high income)	3672.172077
6	East Asia & Pacific (IDA & IBRD countries)	3711.536607
7	Euro area	36868.999976
8	Europe & Central Asia	23073.041669
9	Europe & Central Asia (excluding high income)	7454.868985
10	Europe & Central Asia (IDA & IBRD countries)	7925.818803
11	European Union	33097.135017
12	Fragile and conflict affected situations	1452.224547
13	Heavily indebted poor countries (HIPC)	741.975595
14	High income	38299.566761
15	IBRD only	4254.766887
16	IDA & IBRD total	3499.503076
17	IDA blend	1497.590767
18	IDA only	795.044916
19	IDA total	1035.702608
20	Late-demographic dividend	5786.744220
21	Latin America & Caribbean	8655.327308
22	Latin America & Caribbean (excluding high income)	8357.693657
23	Latin America & the Caribbean (IDA & IBRD coun...	8560.163023
24	Least developed countries: UN classification	776.610112
25	Low & middle income	3388.027840
26	Low income	616.035522
27	Lower middle income	1580.580939
28	Middle East & North Africa	6974.252500
29	Middle East & North Africa (excluding high inc...	4021.537581
...	...	...
234	Sweden	50164.925880
235	Switzerland	73189.174580
236	Syrian Arab Republic	NaN
237	Tajikistan	719.208330

	Country Name	GDP per capita
238	Tanzania	719.723078
239	Thailand	4744.756593
240	Timor-Leste	3766.614678
241	Togo	516.582616
242	Tonga	3433.394230
243	Trinidad and Tobago	16234.981232
244	Tunisia	4043.146435
245	Turkey	9976.150520
246	Turkmenistan	4129.540232
247	Turks and Caicos Islands	NaN
248	Tuvalu	3138.690284
249	Uganda	608.358158
250	Ukraine	2844.323280
251	United Arab Emirates	36024.058229
252	United Kingdom	38986.144513
253	United States	47648.813250
254	Uruguay	11155.845247
255	Uzbekistan	1562.405053
256	Vanuatu	2994.916842
257	Venezuela, RB	14239.039203
258	Vietnam	1250.795761
259	Virgin Islands (U.S.)	39667.191598
260	West Bank and Gaza	2235.045836
261	Yemen, Rep.	1274.465883
262	Zambia	1390.331446
263	Zimbabwe	803.222029

264 rows × 2 columns

In [168]:
```
gdp_per_country['GDP per capita']=gdp_per_country['GDP per capita'].apply(pd.to_numeric)
```

In [169]:
```
countries_and_their_regions=pd.merge(countries,gdp_per_country)
```

```
In [170]: countries_and_their_regions
```

Out[170]:

	Country Code	Short Name	Table Name	Country Name	2-alpha code	Currency Unit	Special Notes	Region
0	ABW	Aruba	Aruba	Aruba	AW	Aruban florin	NaN	Latin America & Caribbean
1	ARB	Arab World	Arab World	Arab World	1A	NaN	Arab World aggregate. Arab World is composed o...	NaN
2	ARE	United Arab Emirates	United Arab Emirates	United Arab Emirates	AE	U.A.E. dirham	NaN	Middle East & North Africa
3	ASM	American Samoa	American Samoa	American Samoa	AS	U.S. dollar	NaN	East Asia & Pacific
4	ATG	Antigua and Barbuda	Antigua and Barbuda	Antigua and Barbuda	AG	East Caribbean dollar	NaN	Latin America & Caribbean
5	BFA	Burkina Faso	Burkina Faso	Burkina Faso	BF	West African CFA franc	NaN	Sub Saharan Africa
6	BIH	Bosnia and Herzegovina	Bosnia and Herzegovina	Bosnia and Herzegovina	BA	Bosnia and Herzegovina convertible mark	NaN	Europe & Central Asia
7	BLZ	Belize	Belize	Belize	BZ	Belize dollar	NaN	Latin America & Caribbean
8	BRB	Barbados	Barbados	Barbados	BB	Barbados dollar	NaN	Latin America & Caribbean
9	BRN	Brunei	Brunei Darussalam	Brunei Darussalam	BN	Brunei dollar	NaN	East Asia & Pacific
10	CAF	Central African Republic	Central African Republic	Central African Republic	CF	Central African CFA franc	NaN	Sub Saharan Africa
11	CAN	Canada	Canada	Canada	CA	Canadian dollar	Fiscal year end: March 31; reporting period fo...	North America

|	Country Code	Short Name	Table Name	Country Name	2-alpha code	Currency Unit	Special Notes	Region
12	CEB	Central Europe and the Baltics	Central Europe and the Baltics	Central Europe and the Baltics	B8	NaN	Central Europe and the Baltics aggregate.	NaN
13	CHE	Switzerland	Switzerland	Switzerland	CH	Swiss franc	NaN	Europe & Central Asia
14	CHI	Channel Islands	Channel Islands	Channel Islands	NaN	Pound sterling	NaN	Europe & Central Asia
15	CSS	Caribbean small states	Caribbean small states	Caribbean small states	S3	NaN	NaN	NaN
16	CYM	Cayman Islands	Cayman Islands	Cayman Islands	KY	Cayman Islands dollar	NaN	Latin America & Caribbean
17	CZE	Czech Republic	Czech Republic	Czech Republic	CZ	Czech koruna	NaN	Europe & Central Asia
18	DOM	Dominican Republic	Dominican Republic	Dominican Republic	DO	Dominican peso	NaN	Latin America & Caribbean
19	EAP	East Asia & Pacific (excluding high income)	East Asia & Pacific (excluding high income)	East Asia & Pacific (excluding high income)	4E	NaN	East Asia and Pacific regional aggregate (does...	NaN
20	EAR	Early-demographic dividend	Early-demographic dividend	Early-demographic dividend	V2	NaN	Early-dividend countries are mostly lower-midd...	NaN
21	EAS	East Asia & Pacific	East Asia & Pacific	East Asia & Pacific	Z4	NaN	East Asia and Pacific regional aggregate (incl...	NaN
22	ECA	Europe & Central Asia (excluding high income)	Europe & Central Asia (excluding high income)	Europe & Central Asia (excluding high income)	7E	NaN	Europe and Central Asia regional aggregate (do...	NaN

	Country Code	Short Name	Table Name	Country Name	2-alpha code	Currency Unit	Special Notes	Region
23	ECS	Europe & Central Asia	Europe & Central Asia	Europe & Central Asia	Z7	NaN	Europe and Central Asia regional aggregate (in...	NaN
24	EMU	Euro area	Euro area	Euro area	XC	NaN	Euro area aggregate.	NaN
25	EUU	European Union	European Union	European Union	EU	NaN	European Union aggregate.	NaN
26	FCS	Fragile and conflict affected situations	Fragile and conflict affected situations	Fragile and conflict affected situations	F1	NaN	Fragile and conflict affected situations aggre...	NaN
27	FRO	Faroe Islands	Faroe Islands	Faroe Islands	FO	Danish krone	NaN	Europe & Central Asia
28	GEO	Georgia	Georgia	Georgia	GE	Georgian lari	Includes self-governed areas only, which mostl...	Europe & Central Asia
29	GIB	Gibraltar	Gibraltar	Gibraltar	GI	Gibraltar pound	NaN	Europe & Central Asia
...	...	...	...	...	...	...	...	...
64	NPL	Nepal	Nepal	Nepal	NP	Nepalese rupee	Fiscal year end: July 14; reporting period for...	South Asia
65	NZL	New Zealand	New Zealand	New Zealand	NZ	New Zealand dollar	Fiscal year end: March 31; reporting period fo...	East Asia & Pacific
66	OED	OECD members	OECD members	OECD members	OE	NaN	Aggregations include Lithuania.	NaN
67	OSS	Other small states	Other small states	Other small states	S4	NaN	NaN	NaN
68	PRE	Pre-demographic dividend	Pre-demographic dividend	Pre-demographic dividend	V1	NaN	Pre-dividend countries are mostly low-income c...	NaN
69	PRI	Puerto Rico	Puerto Rico	Puerto Rico	PR	U.S. dollar	Fiscal year end: June 30; reporting period for...	Latin America & Caribbean

	Country Code	Short Name	Table Name	Country Name	2-alpha code	Currency Unit	Special Notes	Region
70	PSE	West Bank and Gaza	West Bank and Gaza	West Bank and Gaza	PS	Israeli new shekel	NaN	Middle East & North Africa
71	PSS	Pacific island small states	Pacific island small states	Pacific island small states	S2	NaN	Pacific island small states aggregate.	NaN
72	PST	Post-demographic dividend	Post-demographic dividend	Post-demographic dividend	V4	NaN	Post-dividend countries are mostly high-income...	NaN
73	PYF	French Polynesia	French Polynesia	French Polynesia	PF	CFP franc	NaN	East Asia & Pacific
74	ROU	Romania	Romania	Romania	RO	New Romanian leu	NaN	Europe & Central Asia
75	RUS	Russia	Russian Federation	Russian Federation	RU	Russian ruble	NaN	Europe & Central Asia
76	SAS	South Asia	South Asia	South Asia	8S	NaN	NaN	NaN
77	SLB	Solomon Islands	Solomon Islands	Solomon Islands	SB	Solomon Islands dollar	NaN	East Asia & Pacific
78	SSA	Sub-Saharan Africa (excluding high income)	Sub-Saharan Africa (excluding high income)	Sub-Saharan Africa (excluding high income)	ZF	NaN	Sub-Saharan Africa regional aggregate (does no...	NaN
79	SSF	Sub-Saharan Africa	Sub-Saharan Africa	Sub-Saharan Africa	ZG	NaN	Sub-Saharan Africa regional aggregate (include...	NaN
80	SST	Small states	Small states	Small states	S1	NaN	Small states aggregate. Includes 41 members of...	NaN
81	SVK	Slovak Republic	Slovak Republic	Slovak Republic	SK	Euro	A simple multiplier is used to convert the nat...	Europe & Central Asia

	Country Code	Short Name	Table Name	Country Name	2-alpha code	Currency Unit	Special Notes	Region
82	SXM	Sint Maarten (Dutch part)	Sint Maarten (Dutch part)	Sint Maarten (Dutch part)	SX	Netherlands Antillean guilder	NaN	Latin America & Caribbean
83	SYR	Syrian Arab Republic	Syrian Arab Republic	Syrian Arab Republic	SY	Syrian pound	NaN	Middle East & North Africa
84	TCA	Turks and Caicos Islands	Turks and Caicos Islands	Turks and Caicos Islands	TC	U.S. dollar	NaN	Latin America & Caribbean
85	TKM	Turkmenistan	Turkmenistan	Turkmenistan	TM	New Turkmen manat	NaN	Europe & Central Asia
86	TSA	South Asia (IDA & IBRD)	South Asia (IDA & IBRD)	South Asia (IDA & IBRD)	T5	NaN	South Asia (IDA & IBRD countries) aggregate.	NaN
87	TUV	Tuvalu	Tuvalu	Tuvalu	TV	Australian dollar	NaN	East Asia & Pacific
88	UKR	Ukraine	Ukraine	Ukraine	UA	Ukrainian hryvnia	NaN	Europe & Central Asia
89	UMC	Upper middle income	Upper middle income	Upper middle income	XT	NaN	Upper middle income group aggregate. Upper-mid...	NaN
90	VCT	St. Vincent and the Grenadines	St. Vincent and the Grenadines	St. Vincent and the Grenadines	VC	East Caribbean dollar	NaN	Latin America & Caribbean
91	VGB	British Virgin Islands	British Virgin Islands	British Virgin Islands	VG	U.S. dollar	NaN	Latin America & Caribbean
92	WLD	World	World	World	1W	NaN	World aggregate.	NaN
93	WSM	Samoa	Samoa	Samoa	WS	Samoan tala	Fiscal year ends on June 30; reporting period ...	East Asia & Pacific

94 rows × 31 columns
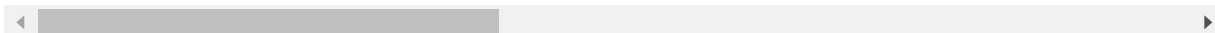
In [180]:
```
gdp_per_region=countries_and_their_regions.groupby(['Region'],as_index=False)[
'GDP per capita'].mean()
```
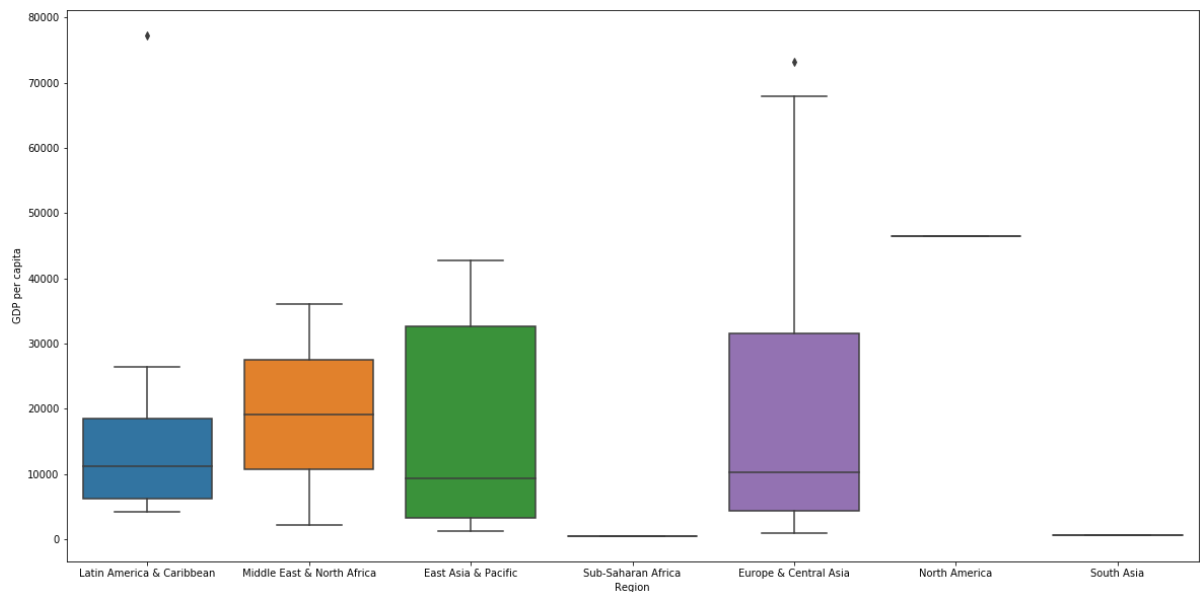
In [181]:
```
gdp_per_region
```

Out[181]:

	Region	GDP per capita
0	East Asia & Pacific	17034.707523
1	Europe & Central Asia	21452.093581
2	Latin America & Caribbean	17598.861476
3	Middle East & North Africa	19129.552033
4	North America	46542.904867
5	South Asia	567.905934
6	Sub-Saharan Africa	517.237524

In [201]:
```
plt.subplots(figsize=(20, 10))
sns.boxplot('Region','GDP per capita',data=countries_and_their_regions)
```

Out[201]: `<matplotlib.axes._subplots.AxesSubplot at 0x209718fbda0>`

In [ ]: