<Middle East Arms Imports>

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Dataset

I used the following dataset:

World Development Indicators Dataset

Motivation

A rumor says that the middle eastern countries import more arms than other countries. In this study, we address the rumor and compare the middle east with other countries like China and India.

Research Questions

The first natural question can be raised here is

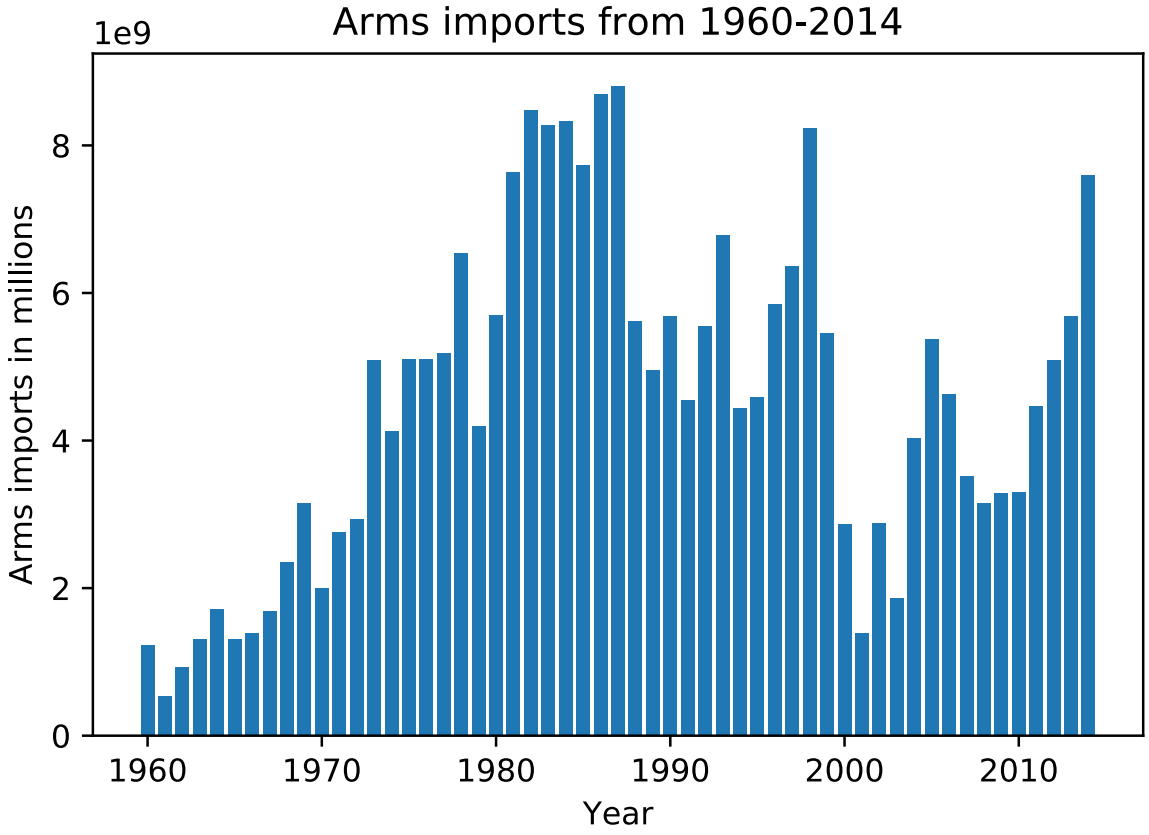
1. Does the middle east tend to import more arms than any China and India?

And the next question following of the first question is

2.What is the connection between the death rate and arms import in the middle east?

Findings

According to the following diagrams, after 1973 arms import is more than 3M except the years between 2000-2003(there was no official conflicts in the middle east).

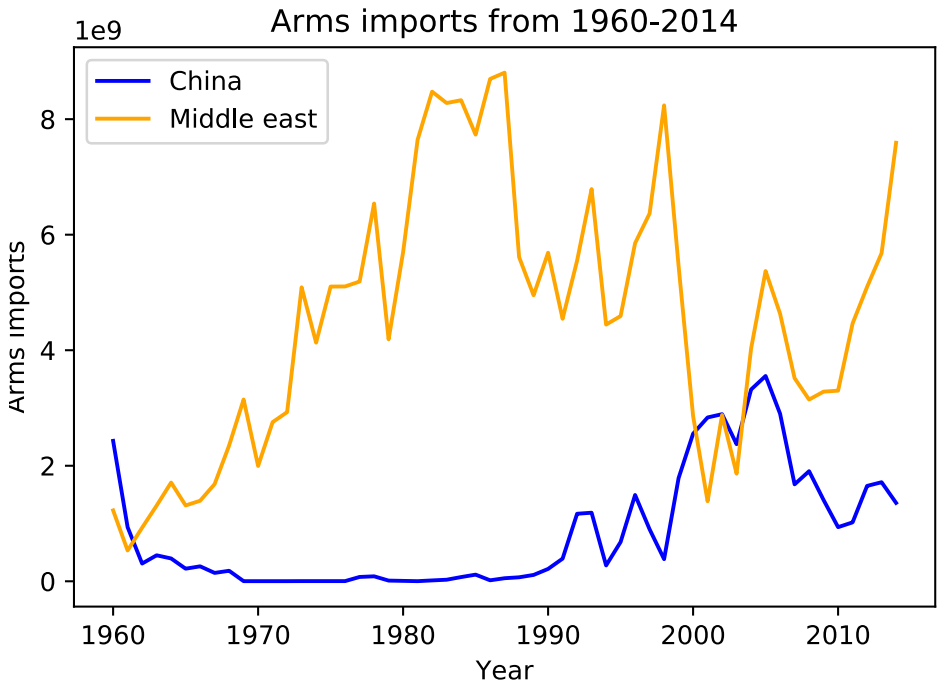


Findings

Next we are going to compare Arms imports between China and the middle eastern countries.

After 1961 Chine only imported more arms than the middle east

Between 2001-2003.

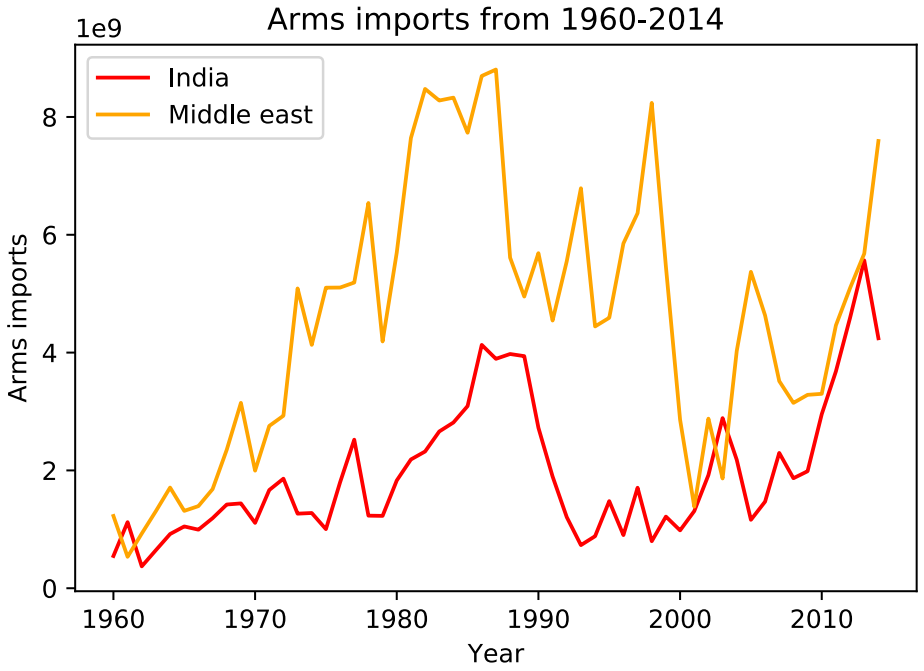


Findings

Next we are going to compare Arms imports between India and the middle eastern countries.

After 1961 India only imported more arms than the middle east

In 2003.



Findings

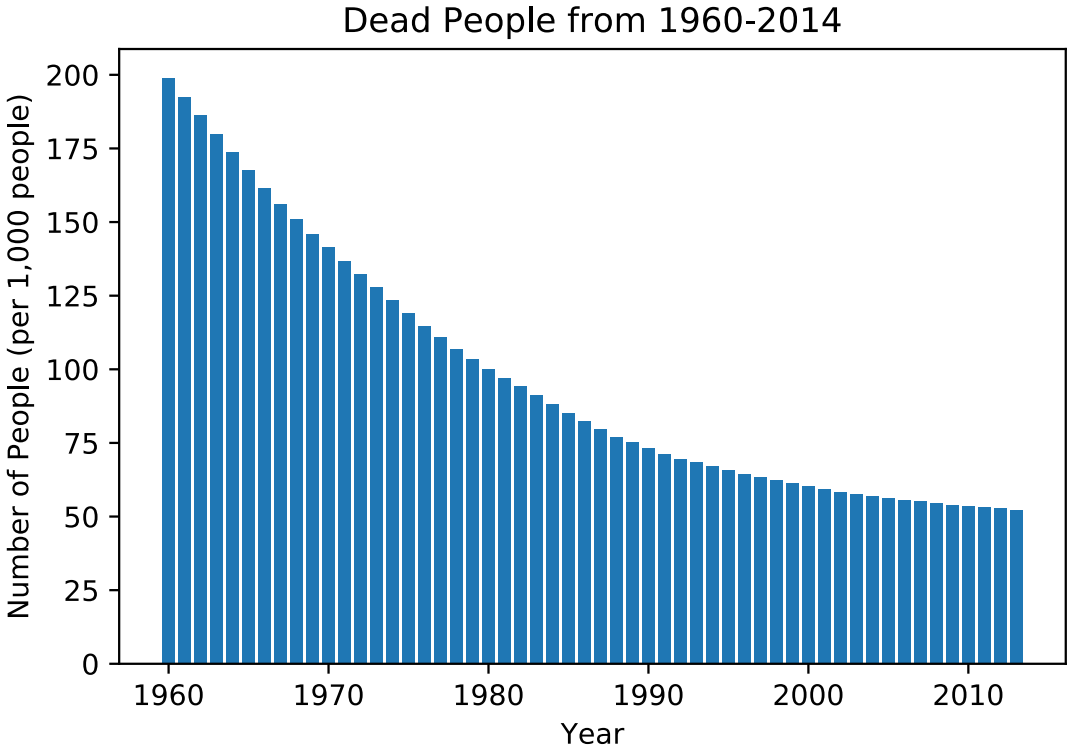
As we can see, the diagram is

Descending and it seems this

Number is independent of arms

Import. In the next slide we

Address the issue.



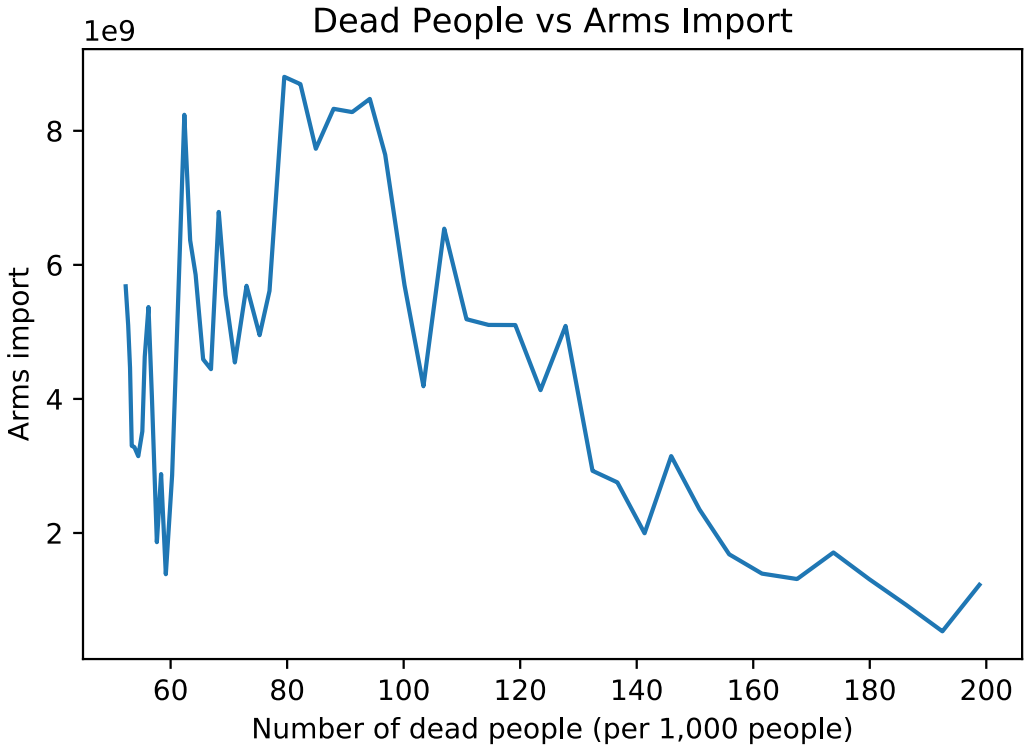
Findings

Fortunately we can see that

There is a negative correlation

Between Arms import and the

Number of dead people.



Acknowledgements

We are deeply grateful to Ilkay and Leo for wonderful lecture and their motivations during the whole lecture. Also we would like to thank Ali Didehvar for his carefully reading and his feedback for this study.

References

Wikipedia for the picture:

https://en.wikipedia.org/wiki/Arab_League

Data Source:

https://www.kaggle.com/worldbank/world-development-indicators

check_data

March 31, 2020

[121]:
```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import matplotlib.pyplot as plt
from matplotlib.ticker import FuncFormatter
from matplotlib.pyplot import figure

#import warnings
```

[122]:
```
df=pd.read_csv('/Users/babi/Data_science/Week-5-Visualization/Indicators.csv')
IndicatorName=df["IndicatorName"].unique().tolist()
df.head
```

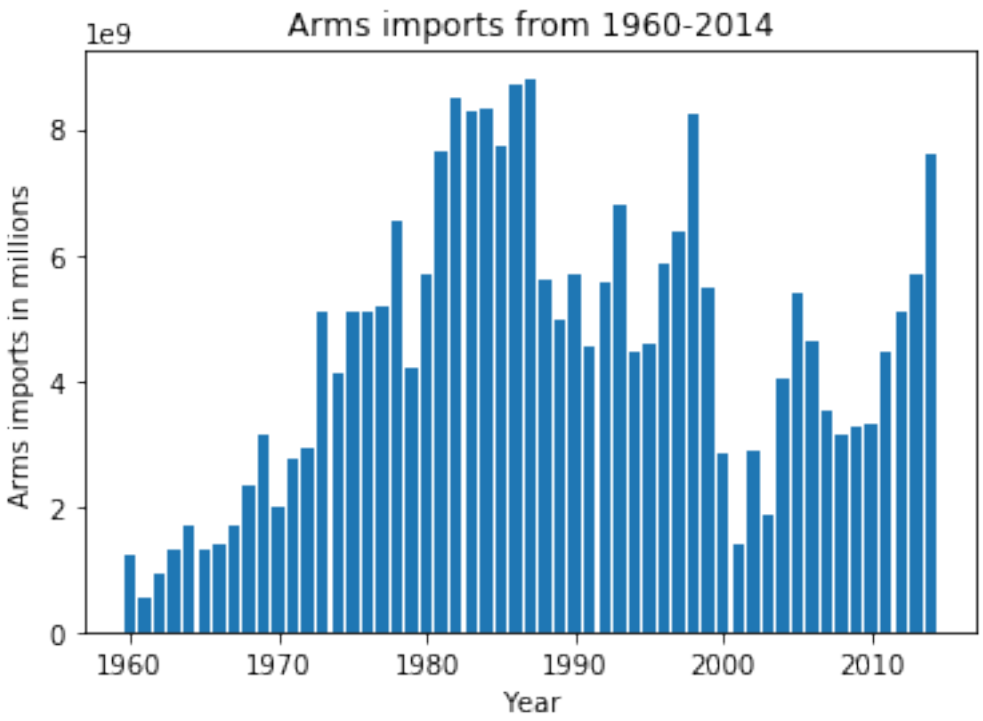
[122]:
```
<bound method NDFrame.head of         CountryName CountryCode  \
0        Arab World         ARB
1        Arab World         ARB
2        Arab World         ARB
3        Arab World         ARB
4        Arab World         ARB
…              …         …
5656453    Zimbabwe         ZWE
5656454    Zimbabwe         ZWE
5656455    Zimbabwe         ZWE
5656456    Zimbabwe         ZWE
5656457    Zimbabwe         ZWE

                                          IndicatorName      IndicatorCode  \
0        Adolescent fertility rate (births per 1,000 wo…        SP.ADO.TFRT
1        Age dependency ratio (% of working-age populat…        SP.POP.DPND
2        Age dependency ratio, old (% of working-age po…     SP.POP.DPND.OL
3        Age dependency ratio, young (% of working-age …     SP.POP.DPND.YG
4              Arms exports (SIPRI trend indicator values)     MS.MIL.XPRT.KD
…                                                      …              …
5656453          Time required to register property (days)        IC.PRP.DURS
5656454           Time required to start a business (days)        IC.REG.DURS
5656455              Time to prepare and pay taxes (hours)        IC.TAX.DURS
5656456                 Time to resolve insolvency (years)        IC.ISV.DURS
5656457           Total tax rate (% of commercial profits)  IC.TAX.TOTL.CP.ZS
```

```
         Year         Value
0        1960  1.335609e+02
1        1960  8.779760e+01
2        1960  6.634579e+00
3        1960  8.102333e+01
4        1960  3.000000e+06
…         …           …
5656453  2015  3.600000e+01
5656454  2015  9.000000e+01
5656455  2015  2.420000e+02
5656456  2015  3.300000e+00
5656457  2015  3.280000e+01

[5656458 rows x 6 columns]>
```

[123]:
```
#Battle=related deaths of countries
middle_east= ['Cyprus','Bahrain','Yemen, Rep.
 ↪','Egypt','Iran','Iraq','Israel','Jordan','Kuwait','Lebanon','Oman','Palestinian␣
 ↪territories','Qatar','Saudi Arabia','Syria','Turkey','United Arab Emirates',]

Arms = df[:][df['IndicatorName']=='Arms imports (SIPRI trend indicator values)']
armmiddle = Arms[:][Arms['CountryName'].isin(middle_east)]
```

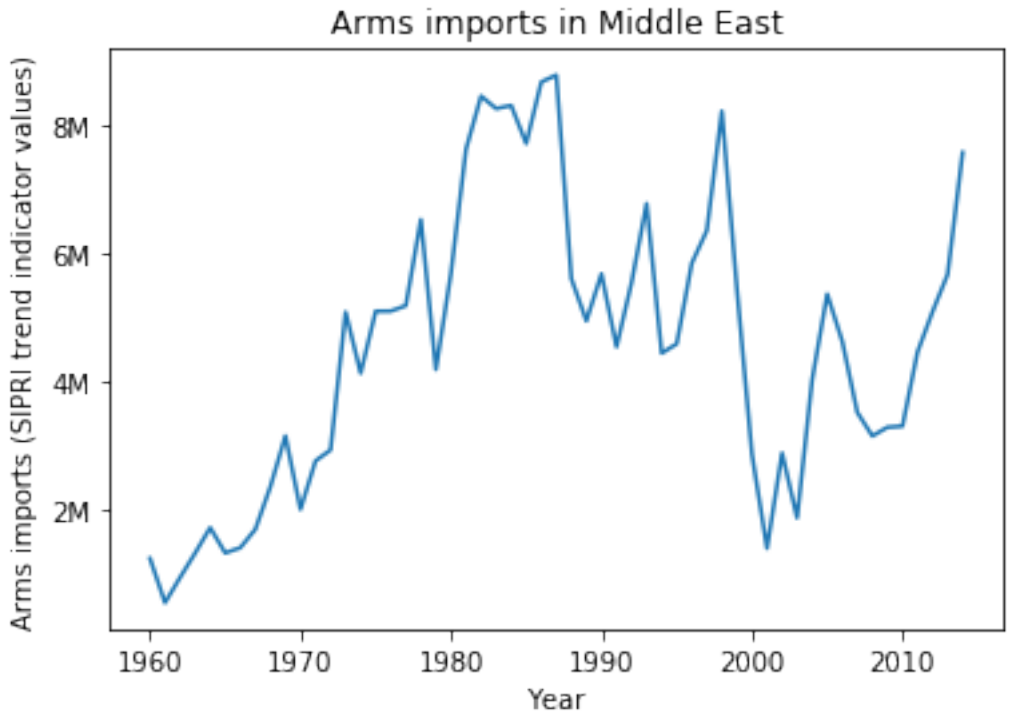
[124]:
```
#grouped by years
newdf= armmiddle.groupby(['Year'])['Value'].sum().reset_index()
```

[125]:
```
# get the years
years = newdf['Year'].values
# get the values
arms = newdf['Value'].values

# create
s=plt.bar(years,arms)
plt.title("Arms imports from 1960-2014")
plt.xlabel("Year")
plt.ylabel("Arms imports in millions")
#y.figure.savefig('Armsmiddle.pdf')
fig = s[0].get_figure()
fig.savefig('Armsmiddle.pdf')
plt.show()
```



[126]:
```
ax=plt.plot(newdf['Year'].values, newdf['Value'].values)

# Label the axes
plt.xlabel('Year')
plt.ylabel(midarms['IndicatorName'].iloc[0])

#label the figure
plt.title('Arms imports in Middle East')

# to make more honest, start the y axis at 0
#plt.axis([1959, 2015, 0, 1.9e10])

ax = plt.gca()
ax.yaxis.get_major_formatter().set_scientific(False)

def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.yaxis.set_major_formatter(formatter)
```

```
ax.figure.savefig('Armsmiddleline.pdf')

plt.show()
```



[142]:
```
#newdf['Value'].values
#years with less than 3M
newdf.loc[newdf['Value'] <=3000000000]
#if i in
```

[142]:

	Year	Value
0	1960	1.227000e+09
1	1961	5.330000e+08
2	1962	9.280000e+08
3	1963	1.310000e+09
4	1964	1.709000e+09
5	1965	1.313000e+09
6	1966	1.394000e+09
7	1967	1.682000e+09
8	1968	2.351000e+09
10	1970	1.996000e+09
11	1971	2.755000e+09
12	1972	2.928000e+09
40	2000	2.861000e+09

```
41  2001  1.385000e+09
42  2002  2.879000e+09
43  2003  1.863000e+09
```

[147]:
```
Indiaarm = Arms[:][Arms['CountryName']=='India']
Chinaarm = Arms[:][Arms['CountryName']=='China']
newdf
```

[147]:

	Year	Value
0	1960	1.227000e+09
1	1961	5.330000e+08
2	1962	9.280000e+08
3	1963	1.310000e+09
4	1964	1.709000e+09
5	1965	1.313000e+09
6	1966	1.394000e+09
7	1967	1.682000e+09
8	1968	2.351000e+09
9	1969	3.147000e+09
10	1970	1.996000e+09
11	1971	2.755000e+09
12	1972	2.928000e+09
13	1973	5.089000e+09
14	1974	4.131000e+09
15	1975	5.102000e+09
16	1976	5.104000e+09
17	1977	5.189000e+09
18	1978	6.540000e+09
19	1979	4.189000e+09
20	1980	5.698000e+09
21	1981	7.643000e+09
22	1982	8.476000e+09
23	1983	8.279000e+09
24	1984	8.328000e+09
25	1985	7.732000e+09
26	1986	8.696000e+09
27	1987	8.805000e+09
28	1988	5.612000e+09
29	1989	4.951000e+09
30	1990	5.688000e+09
31	1991	4.544000e+09
32	1992	5.551000e+09
33	1993	6.790000e+09
34	1994	4.444000e+09
35	1995	4.591000e+09
36	1996	5.853000e+09
37	1997	6.367000e+09

```
38  1998  8.239000e+09
39  1999  5.458000e+09
40  2000  2.861000e+09
41  2001  1.385000e+09
42  2002  2.879000e+09
43  2003  1.863000e+09
44  2004  4.028000e+09
45  2005  5.371000e+09
46  2006  4.631000e+09
47  2007  3.516000e+09
48  2008  3.146000e+09
49  2009  3.283000e+09
50  2010  3.300000e+09
51  2011  4.463000e+09
52  2012  5.096000e+09
53  2013  5.680000e+09
54  2014  7.592000e+09
```

[153]:
```
Chinaarmvalue = Arms[:][Arms['CountryName']=='China'].reset_index()

newdf.loc[newdf['Value'] <= Chinaarmvalue['Value']]
```

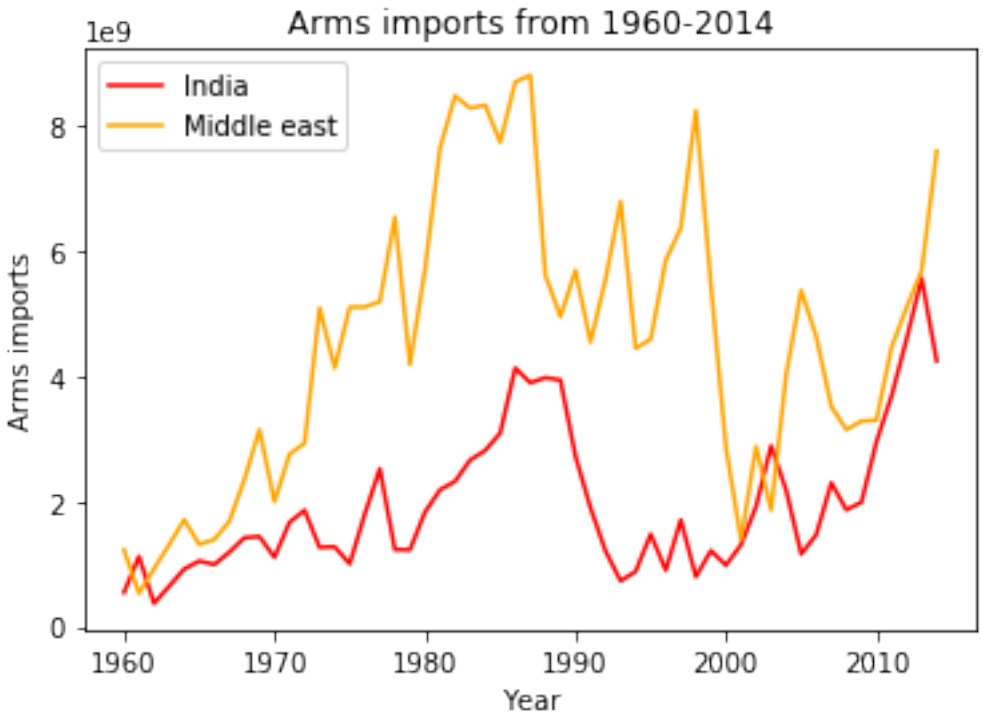
[153]:
```
    Year         Value
0   1960  1.227000e+09
1   1961  5.330000e+08
41  2001  1.385000e+09
42  2002  2.879000e+09
43  2003  1.863000e+09
```

[157]:
```
Indiaarmvalue = Arms[:][Arms['CountryName']=='India'].reset_index()

newdf.loc[newdf['Value'] <= Indiaarmvalue['Value']]
```

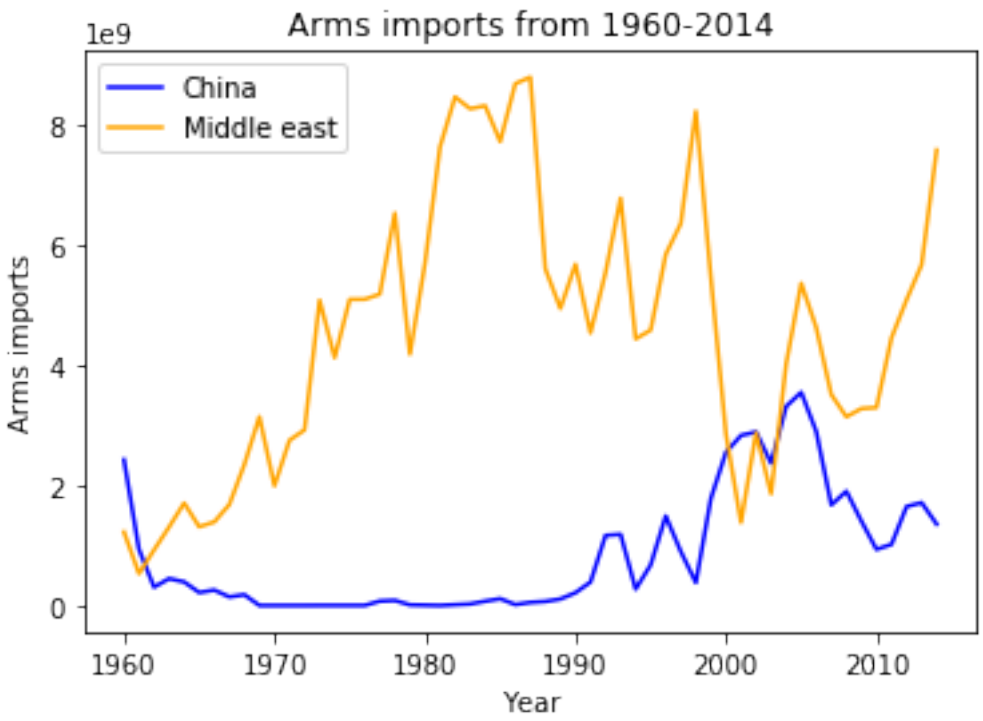
[157]:
```
    Year         Value
1   1961  5.330000e+08
43  2003  1.863000e+09
```

[156]:
```
ax=Indiaarm.plot(kind='line',x='Year',y='Value',color='red')
y=newdf.plot(kind='line',x='Year',y='Value',color='orange',ax=ax)


# Label the axes
plt.xlabel('Year')
plt.ylabel('Arms imports')

#label the figure
plt.title('Arms imports from 1960-2014')
```

```
plt.legend(('India', 'Middle east',),    loc='upper left')
ax.figure.savefig('Indiaandmiddle.pdf')

plt.show()
```

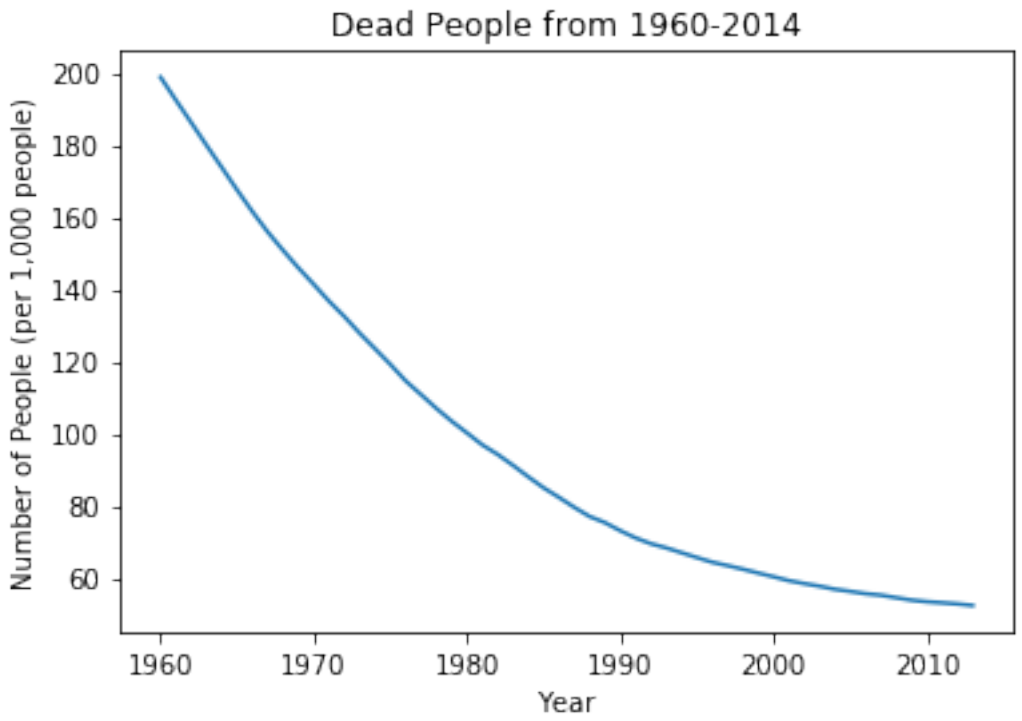


[143]:
```
ax=Chinaarm.plot(kind='line',x='Year',y='Value',color='Blue')
y=newdf.plot(kind='line',x='Year',y='Value',color='orange',ax=ax)


# Label the axes
plt.xlabel('Year')
plt.ylabel('Arms imports')

#label the figure
plt.title('Arms imports from 1960-2014')

plt.legend(('China', 'Middle east',),    loc='upper left')
ax.figure.savefig('Chinamiddle.pdf')


plt.show()
```

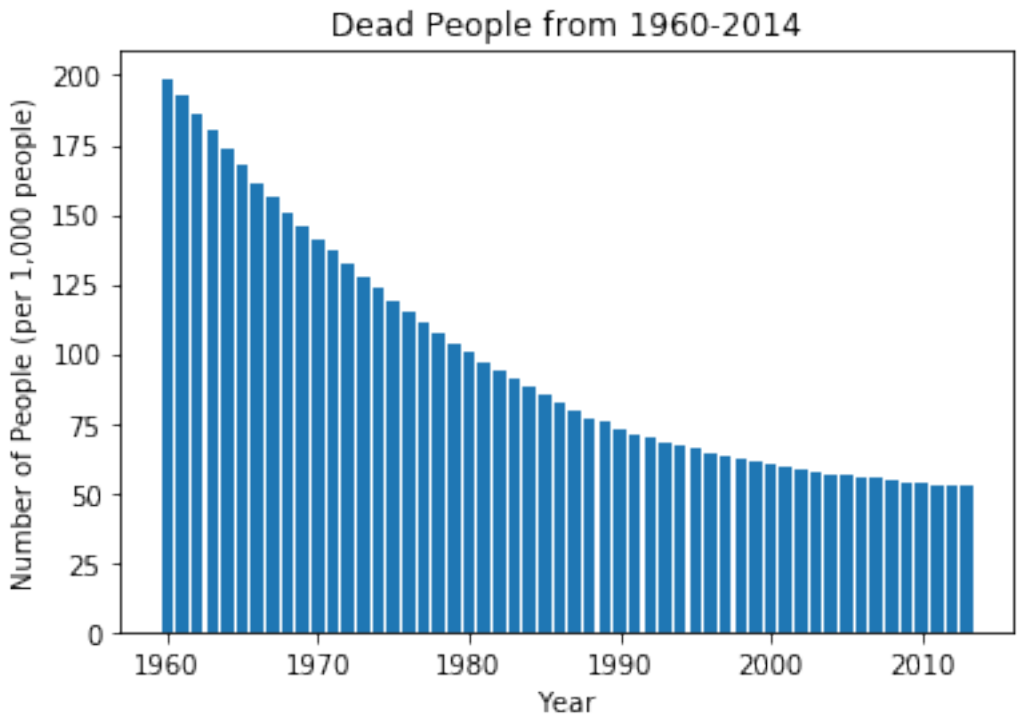


[130]:
```
battledeaths = df[:][df['IndicatorName']=='Death rate, crude (per 1,000␣
↪people)']
midbattledeaths=battledeaths[battledeaths['CountryName'].isin(middle_east)]
newdf2= midbattledeaths.groupby(['Year'])['Value'].sum().reset_index()
```

[132]:
```
plt.plot(newdf2['Year'].values, newdf2['Value'].values)
#y=plt.plot(newdf['Year'].values, newdf['Value'].values,ax=ax)
ax = plt.gca()

# Label the axes
plt.xlabel('Year')
plt.ylabel('Number of People (per 1,000 people)')


#label the figure
plt.title('Dead People from 1960-2014')
ax.figure.savefig('deathratemiddile.pdf')

plt.show()
```



[133]:
```
# get the years
years = newdf2['Year'].values
# get the values
arms = newdf2['Value'].values

# create
r=plt.bar(years,arms)
plt.title("Dead People from 1960-2014")
plt.xlabel("Year")
plt.ylabel("Number of People (per 1,000 people)")
fig = r[0].get_figure()
fig.savefig('bardeatrate.pdf')


plt.show()
```



[166]:
```
#merging two dataframes base on Year
df3 = pd.merge(newdf2, newdf, on='Year')
df3
```

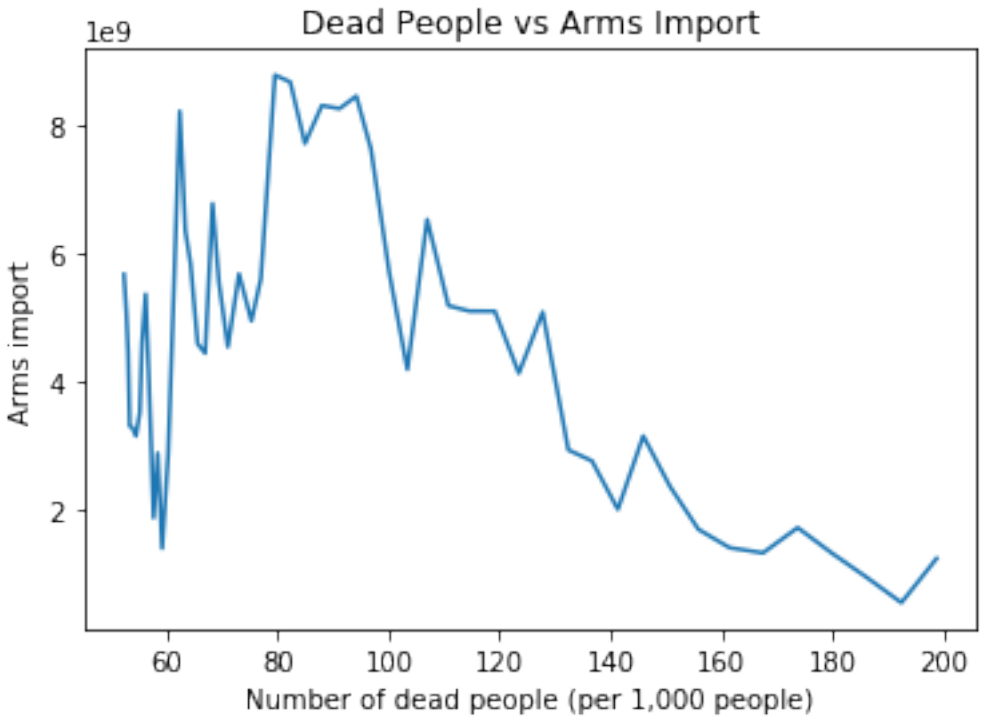
[166]:

	Year	Value_x	Value_y
0	1960	198.824	1.227000e+09
1	1961	192.466	5.330000e+08
2	1962	186.238	9.280000e+08
3	1963	179.926	1.310000e+09
4	1964	173.763	1.709000e+09
5	1965	167.523	1.313000e+09
6	1966	161.499	1.394000e+09
7	1967	155.869	1.682000e+09
8	1968	150.774	2.351000e+09
9	1969	145.919	3.147000e+09
10	1970	141.347	1.996000e+09
11	1971	136.678	2.755000e+09
12	1972	132.412	2.928000e+09
13	1973	127.788	5.089000e+09
14	1974	123.491	4.131000e+09
15	1975	119.163	5.102000e+09
16	1976	114.569	5.104000e+09
17	1977	110.785	5.189000e+09

```
18  1978  106.962  6.540000e+09
19  1979  103.395  4.189000e+09
20  1980  100.144  5.698000e+09
21  1981   96.830  7.643000e+09
22  1982   94.189  8.476000e+09
23  1983   91.169  8.279000e+09
24  1984   87.972  8.328000e+09
25  1985   84.923  7.732000e+09
26  1986   82.280  8.696000e+09
27  1987   79.513  8.805000e+09
28  1988   76.973  5.612000e+09
29  1989   75.276  4.951000e+09
30  1990   73.031  5.688000e+09
31  1991   71.028  4.544000e+09
32  1992   69.421  5.551000e+09
33  1993   68.264  6.790000e+09
34  1994   66.928  4.444000e+09
35  1995   65.583  4.591000e+09
36  1996   64.292  5.853000e+09
37  1997   63.354  6.367000e+09
38  1998   62.356  8.239000e+09
39  1999   61.289  5.458000e+09
40  2000   60.259  2.861000e+09
41  2001   59.178  1.385000e+09
42  2002   58.368  2.879000e+09
43  2003   57.639  1.863000e+09
44  2004   56.790  4.028000e+09
45  2005   56.203  5.371000e+09
46  2006   55.562  4.631000e+09
47  2007   55.146  3.516000e+09
48  2008   54.449  3.146000e+09
49  2009   53.774  3.283000e+09
50  2010   53.329  3.300000e+09
51  2011   53.036  4.463000e+09
52  2012   52.720  5.096000e+09
53  2013   52.289  5.680000e+09
```

[167]:
```
plt.plot(df3['Value_x'].values, df3['Value_y'].values)
#y=plt.plot(newdf['Year'].values, newdf['Value'].values,ax=ax)
ax = plt.gca()

# Label the axes
plt.xlabel('Number of dead people (per 1,000 people)')
plt.ylabel('Arms import')


#label the figure
```

```
plt.title('Dead People vs Arms Import')
ax.figure.savefig('deathvsimport.pdf')

plt.show()
```



[168]:
```
y=df3['Value_y'].values
x=df3['Value_x'].values

np.corrcoef(x, y)
```

[168]:
```
array([[ 1.        , -0.51188005],
       [-0.51188005,  1.        ]])
```