

Do Western Countries tend
to export more Arms than
any other country?

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Dataset

- World Development Indicators Dataset

Motivation

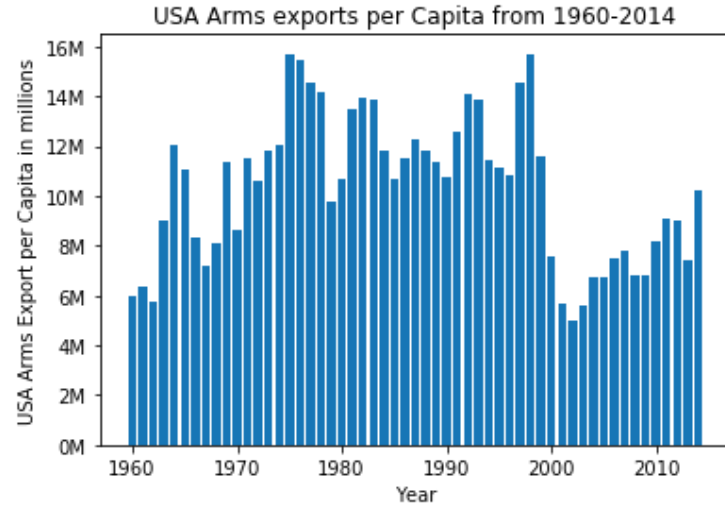
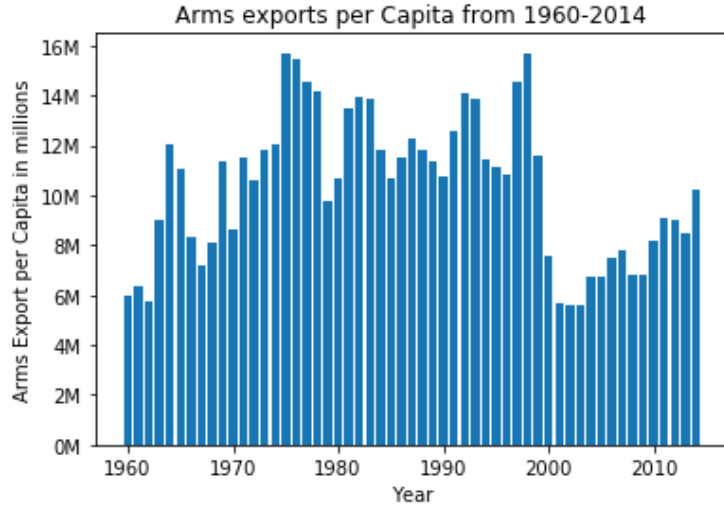
Does USA export more arms than other countries? Countries have been known for supplying/selling arms to the side of a warring faction that they support. But is the USA the only/main country to blame for the wide spread of arms?

Research Question(s)

Do Western Countries export more arms than any other country?

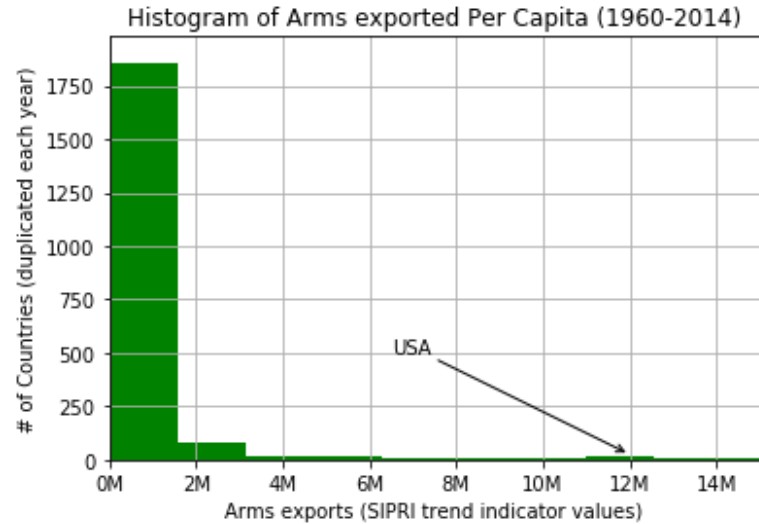
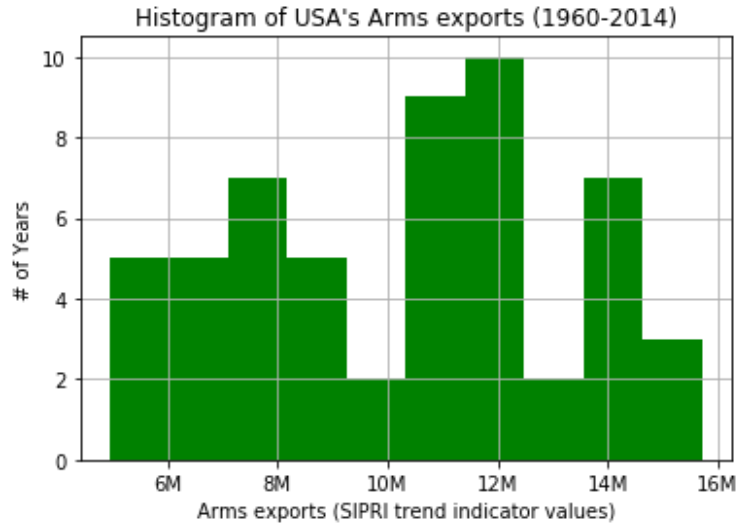
Is there a perceived correlation between death rates and arms exports?

Findings



Between these two bar charts we can see that in 2002 and 2013 there were greater arms exports Globally than in the USA. So in 2002 and in 2013 the USA was not the leading contributor to arms exported but from 1960-2001 and 2003-2012 and 2014 the USA arms exports per capita almost identically match up with the arms exported per capita globally.

Findings



With the first histogram we can see the arms exported per capita by the USA from 1960-2014. This chart shows that for most of those years the USA exported between 11 and 13 million arms. Using this information the second histogram displays the arms exported per capita globally from 1960-2014, with the USA annotated above the 12 million marker. Most countries lie between 0 and 1 million arms exported, while the USA and several other countries contribute on a larger scale.

Findings

From this data it seems that the USA is a top contributor to arms exports globally from 1960-2014, except in 2002 and 2013.

Acknowledgements

Ilkay and Leo for their fantastically designed and taught class.

References

All my own work, except for matplotlib documentation and things I've learned in this course.

Mini Project

December 13, 2017

```
In [1]: import pandas as pd
import numpy as np
import random
import matplotlib.pyplot as plt
from matplotlib.ticker import FuncFormatter
```

```
In [2]: data = pd.read_csv('~/.EdX-Data-Scientist-Education/UCSanDiegoX-DSE200x-Python-for-Data-Science/data.csv')
data.shape
```

```
Out[2]: (5656458, 6)
```

```
In [3]: data.head(10)
```

```
Out[3]:
```

	CountryName	CountryCode	IndicatorName	\
0	Arab World	ARB	Adolescent fertility rate (births per 1,000 wo...	
1	Arab World	ARB	Age dependency ratio (% of working-age populat...	
2	Arab World	ARB	Age dependency ratio, old (% of working-age po...	
3	Arab World	ARB	Age dependency ratio, young (% of working-age ...	
4	Arab World	ARB	Arms exports (SIPRI trend indicator values)	
5	Arab World	ARB	Arms imports (SIPRI trend indicator values)	
6	Arab World	ARB	Birth rate, crude (per 1,000 people)	
7	Arab World	ARB	CO2 emissions (kt)	
8	Arab World	ARB	CO2 emissions (metric tons per capita)	
9	Arab World	ARB	CO2 emissions from gaseous fuel consumption (%...	

	IndicatorCode	Year	Value
0	SP.ADO.TFRT	1960	1.335609e+02
1	SP.POP.DPND	1960	8.779760e+01
2	SP.POP.DPND.OL	1960	6.634579e+00
3	SP.POP.DPND.YG	1960	8.102333e+01
4	MS.MIL.XPRT.KD	1960	3.000000e+06
5	MS.MIL.MPRT.KD	1960	5.380000e+08
6	SP.DYN.CBRT.IN	1960	4.769789e+01
7	EN.ATM.CO2E.KT	1960	5.956399e+04
8	EN.ATM.CO2E.PC	1960	6.439635e-01
9	EN.ATM.CO2E.GF.ZS	1960	5.041292e+00

0.1 What is the range of years?

```
In [4]: years = data['Year'].unique().tolist()
        print(min(years), '-', max(years))
```

1960 - 2015

0.2 What are the unique Country names and codes, and how many are there?

```
In [5]: # List unique countries and the count or length of list
        countries = data['CountryName'].unique().tolist()
        countryCode = data['CountryCode'].unique().tolist()
```

```
        print(countries, countryCode, len(countries), len(countryCode))
```

['Arab World', 'Caribbean small states', 'Central Europe and the Baltics', 'East Asia & Pacific

0.3 Checking for null values

```
In [6]: data.isnull().any()
```

```
Out [6]: CountryName      False
         CountryCode      False
         IndicatorName     False
         IndicatorCode     False
         Year              False
         Value             False
         dtype: bool
```

0.4 Value Statistics - use to evaluate overall country exports from 1980 - 2015

```
In [7]: data['Value'].describe()
```

```
Out [7]: count      5.656458e+06
         mean       1.070501e+12
         std        4.842469e+13
         min        -9.824821e+15
         25%        5.566242e+00
         50%        6.357450e+01
         75%        1.346722e+07
         max        1.103367e+16
         Name: Value, dtype: float64
```

```
In [8]: data.std(axis=0)
```

```
Out [8]: Year       1.387895e+01
         Value      4.842469e+13
         dtype: float64
```

```
In [9]: data['CountryName'].count()
```

```
Out[9]: 5656458
```

0.5 Most common value in column 'Value'

```
In [10]: data['Value'].mode()
```

```
Out[10]: 0      0.0  
         dtype: float64
```

0.6 Lowest value in column 'Value'

```
In [11]: data['Value'].min()
```

```
Out[11]: -9824821297572060.0
```

0.7 Highest value in column 'Value'

```
In [12]: data['Value'].max()
```

```
Out[12]: 11033666000000000.0
```

0.8 Remove Unwanted CountryCode rows

0.8.1 Find grouped countries via the country code

```
In [13]: data.columns
```

```
Out[13]: Index(['CountryName', 'CountryCode', 'IndicatorName', 'IndicatorCode', 'Year',  
               'Value'],  
              dtype='object')
```

```
In [14]: data.set_index('CountryCode', inplace=True, drop=False)
```

```
In [15]: data = data.drop(['HIC', 'OEC', 'OED', 'NOC', 'CEB', 'EAP', 'EMU', 'ECS', 'ECA', 'EUU',  
                          #data.head(10)
```

```
In [16]: data = data.reset_index(drop=True)
```

```
In [17]: data.shape
```

```
Out[17]: (5059963, 6)
```

0.9 Select Arms Exports from all countries

```
In [99]: # Data selected: Arms exports
arms_stage = data[data['IndicatorName'].str.contains('Arms exports \ (SIPRI)']

In [100]: arms_stage.shape

Out[100]: (2024, 6)

In [101]: arms_stage.head()

Out[101]:
```

	CountryName	CountryCode	\
4664484	United States	USA	
4606252	Russian Federation	RUS	
4472579	France	FRA	
4453682	United Kingdom	GBR	
4408557	Germany	DEU	

	IndicatorName	IndicatorCode	Year	\
4664484	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	
4606252	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	
4472579	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	
4453682	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	
4408557	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	

	Value
4664484	1.019400e+10
4606252	5.971000e+09
4472579	1.978000e+09
4453682	1.704000e+09
4408557	1.200000e+09

0.10 Filter for yearly USA exports

```
In [95]: # select Arms export for the World
hist_indicator = 'Arms exports \ (SIPRI'
hist_year = 2014
hist_country = 'USA'

mask1 = data['IndicatorName'].str.contains(hist_indicator)
#mask2 = data['Year'].isin([hist_year])
mask2 = data['Year'].between(1960, 1980)
mask3 = data['CountryCode'].str.contains(hist_country)

# stage is just those indicators matching the 1980 for year and Arms export over time
usa_stage = data[mask1 & mask3]
usa_67 = data[mask1 & mask2 & mask3]

In [96]: usa_stage.head(11)
```

```
Out [96]:
```

	CountryName	CountryCode	\
4664484	United States	USA	
4629943	United States	USA	
4651699	United States	USA	
4652810	United States	USA	
4640880	United States	USA	
4621048	United States	USA	
4620931	United States	USA	
4636237	United States	USA	
4631888	United States	USA	
4620019	United States	USA	
4619906	United States	USA	

	IndicatorName	IndicatorCode	Year	\
4664484	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2014	
4629943	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2013	
4651699	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2012	
4652810	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2011	
4640880	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2010	
4621048	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2009	
4620931	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2008	
4636237	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2007	
4631888	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2006	
4620019	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2005	
4619906	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	2004	

	Value
4664484	1.019400e+10
4629943	7.384000e+09
4651699	9.018000e+09
4652810	9.111000e+09
4640880	8.169000e+09
4621048	6.822000e+09
4620931	6.814000e+09
4636237	7.834000e+09
4631888	7.521000e+09
4620019	6.758000e+09
4619906	6.752000e+09

```
In [23]: type(usa_stage)
```

```
Out [23]: pandas.core.frame.DataFrame
```

0.11 Bar Chart Arms Export per Capita

```
In [93]: # get the years
years = arms_stage['Year'].values
# get the values
```

```

arms = arms_stage['Value'].values

# create
plt.bar(years, arms)
plt.title("Arms exports per Capita from 1960-2014")
plt.xlabel("Year")
plt.ylabel("Arms Export per Capita in millions")

# format the number output on the y-axis
ax = plt.gca()
ax.yaxis.get_major_formatter().set_scientific(False)

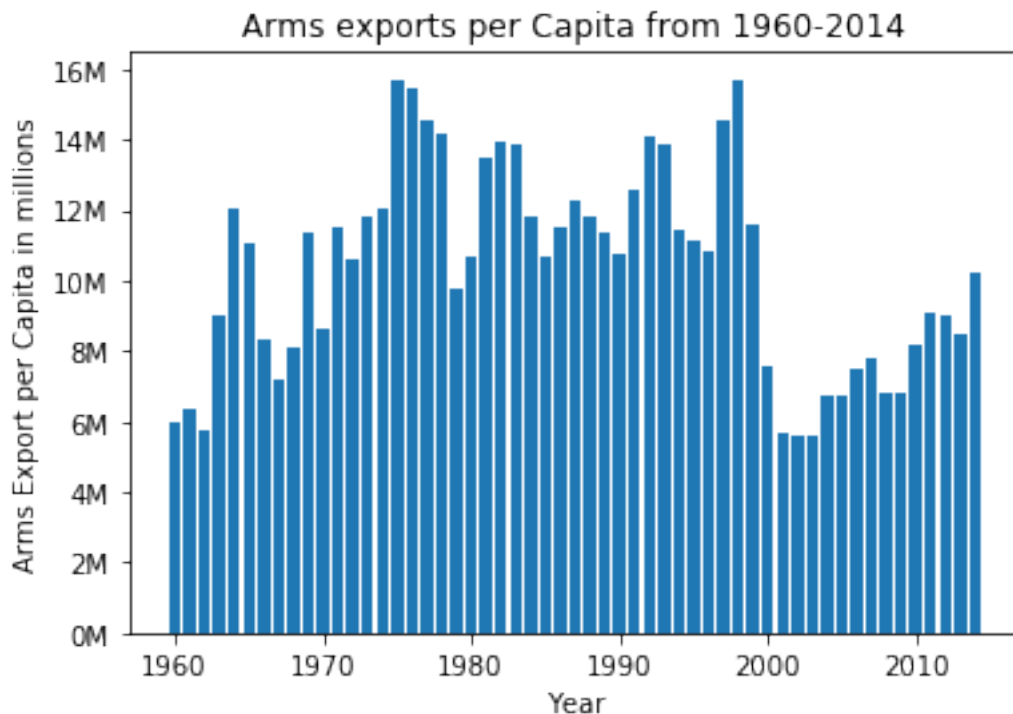
def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.yaxis.set_major_formatter(formatter)

plt.show()

```



0.12 Bar chart of yearly USA arms exports

```
In [97]: # get the years
years = usa_stage['Year'].values
# get the values
arms = usa_stage['Value'].values

# create
plt.bar(years, arms)
plt.title("USA Arms exports per Capita from 1960-2014")
plt.xlabel("Year")
plt.ylabel("USA Arms Export per Capita in millions")

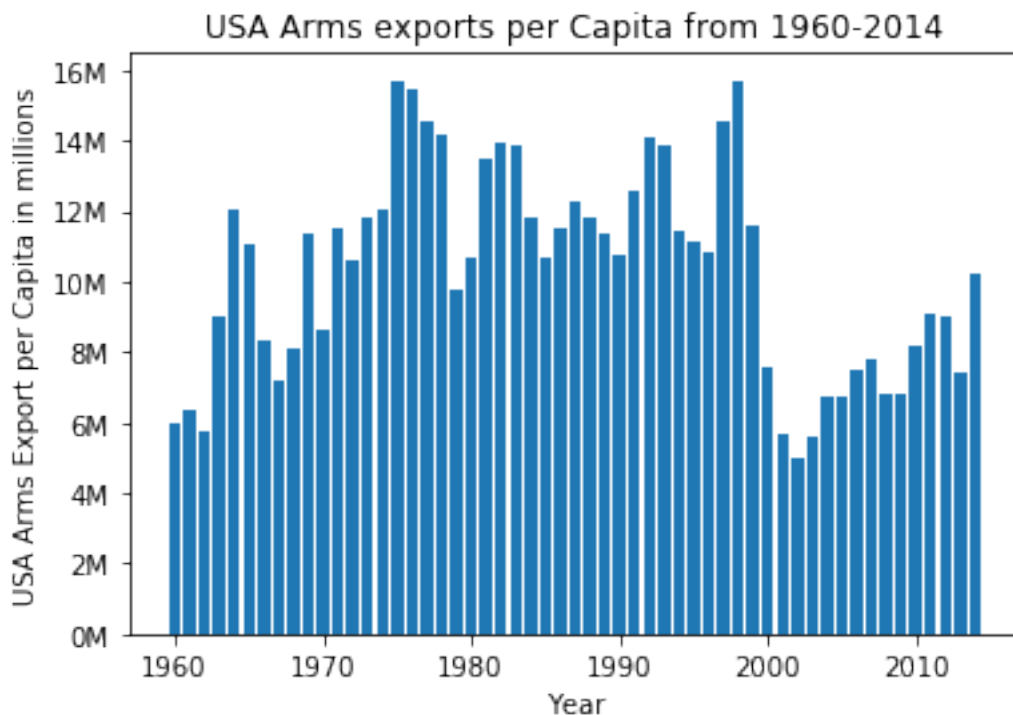
# format the number output on the y-axis
ax = plt.gca()
ax.yaxis.get_major_formatter().set_scientific(False)

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)

plt.show()
```



Notable years: 2002, 2013 There is an increase in global exports compared to USA

0.13 Line Graph of USA arms exports annual

```
In [30]: # switch to a line plot
plt.plot(usa_stage['Year'].values, usa_stage['Value'].values)

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

#label the figure
plt.title('Arms Exports in USA')

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

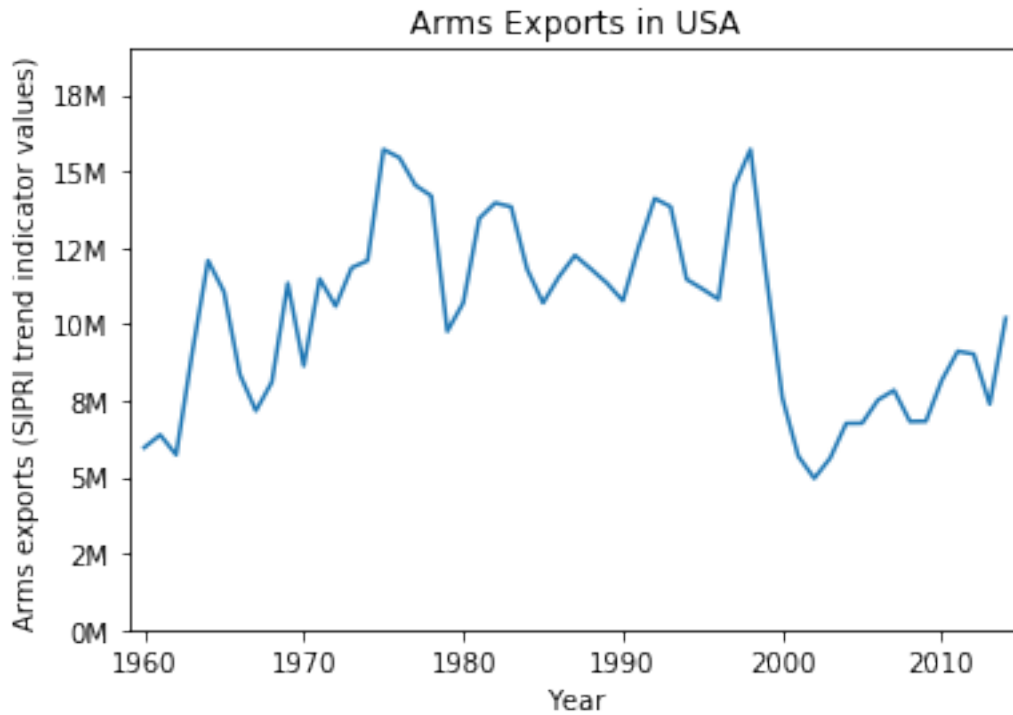
ax = plt.gca()
ax.yaxis.get_major_formatter().set_scientific(False)

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)

plt.show()
```



0.14 Histogram of Global and USA Arms exports annual

```
In [31]: hist_data = usa_stage['Value'].values
plt.hist(usa_stage['Value'].values, 10, normed=False, facecolor='green')

plt.xlabel(usa_stage['IndicatorName'].iloc[0])
plt.ylabel('# of Years')
plt.title("Histogram of USA's Arms exports (1960-2014)")

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

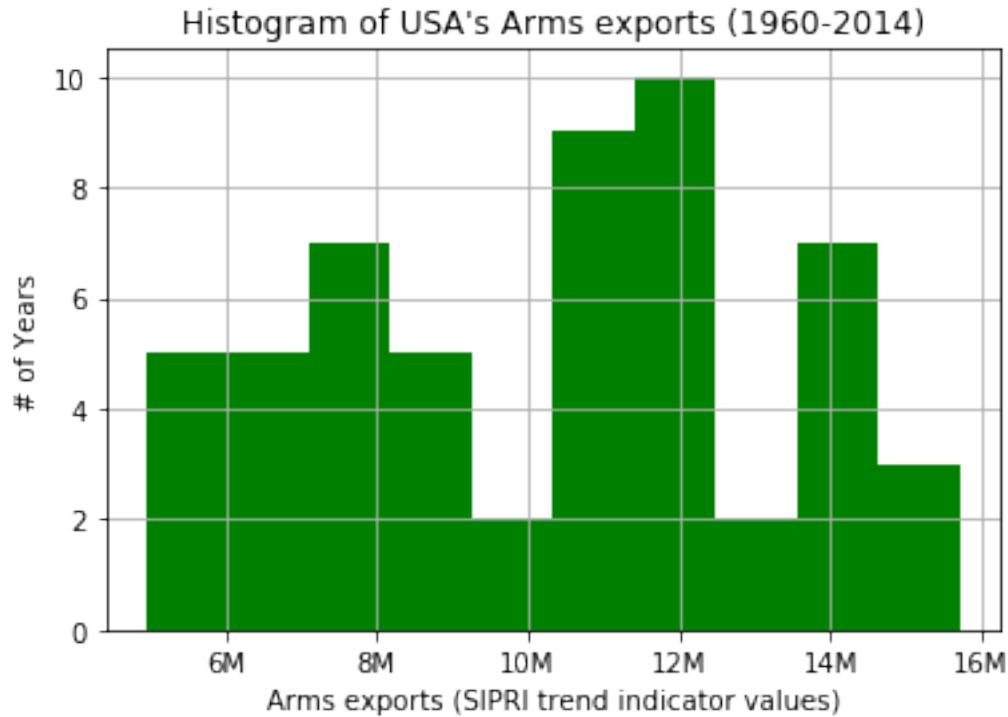
def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.xaxis.set_major_formatter(formatter)

#plt.axis([10, 22, 0, 14])
plt.grid(True)

plt.show()
```



So the USA has many years where it exported between 10M-12M arms per capita with outliers on either side.

```
In [32]: print(hist_data)
```

```
[ 5.96100000e+09  6.37600000e+09  5.72500000e+09  9.02900000e+09
 1.20770000e+10  1.10540000e+10  8.34900000e+09  7.16500000e+09
 8.10100000e+09  1.13340000e+10  8.63400000e+09  1.14780000e+10
 1.05850000e+10  1.18390000e+10  1.20740000e+10  1.57080000e+10
 1.54400000e+10  1.45370000e+10  1.41860000e+10  9.76400000e+09
 1.06970000e+10  1.34510000e+10  1.39600000e+10  1.38340000e+10
 1.17960000e+10  1.06890000e+10  1.15480000e+10  1.22430000e+10
 1.18010000e+10  1.13420000e+10  1.07620000e+10  1.25400000e+10
 1.41070000e+10  1.38360000e+10  1.14610000e+10  1.11460000e+10
 1.08080000e+10  1.45180000e+10  1.57080000e+10  1.15530000e+10
 7.59100000e+09  5.68200000e+09  4.95500000e+09  5.61800000e+09
 6.75200000e+09  6.75800000e+09  7.52100000e+09  7.83400000e+09
 6.81400000e+09  6.82200000e+09  8.16900000e+09  9.11100000e+09
 9.01800000e+09  7.38400000e+09  1.01940000e+10]
```

0.15 How does USA compare to other countries

```
In [120]: data = data.sort_values(by=['Year', 'Value'], ascending=False)
          data.head(10)
```

```
Out [120]:
```

	CountryName	CountryCode	\
4918852	South Asia	SAS	
4914010	Pakistan	PAK	
4913622	South Asia	SAS	
4913619	South Asia	SAS	
4913319	Pakistan	PAK	
4913320	Pakistan	PAK	
4730595	Romania	ROM	
4727366	Mexico	MEX	
4724948	South Asia	SAS	
4721109	Mexico	MEX	

		IndicatorName	IndicatorCode	\
4918852	Disbursements on external debt, long-term (DIS...	DT.DIS.DLXF.CD		
4914010	Disbursements on external debt, long-term (DIS...	DT.DIS.DLXF.CD		
4913622	PPG, private creditors (DIS, current US\$)	DT.DIS.PRVT.CD		
4913619	PPG, commercial banks (DIS, current US\$)	DT.DIS.PCBK.CD		
4913319	PPG, private creditors (DIS, current US\$)	DT.DIS.PRVT.CD		
4913320	PPG, commercial banks (DIS, current US\$)	DT.DIS.PCBK.CD		
4730595	Principal repayments on external debt, long-te...	DT.AMT.DLXF.CD		
4727366	Principal repayments on external debt, long-te...	DT.AMT.DLXF.CD		
4724948	PPG, official creditors (DIS, current US\$)	DT.DIS.OFFT.CD		
4721109	PPG, private creditors (AMT, current US\$)	DT.AMT.PRVT.CD		

	Year	Value
4918852	2015	2.287139e+11
4914010	2015	2.111025e+11
4913622	2015	2.097367e+11
4913619	2015	2.097213e+11
4913319	2015	2.087984e+11
4913320	2015	2.087984e+11
4730595	2015	2.014780e+10
4727366	2015	1.946834e+10
4724948	2015	1.897722e+10
4721109	2015	1.821751e+10

```
In [121]: # select arms exports for all countries in 2011
hist_indicator = 'Arms exports \ (SIPRI'
hist_year = 1990

mask1 = data['IndicatorName'].str.contains(hist_indicator)
mask2 = data['Year'].isin([hist_year])
mask3 = data['Year'].between(1973, 1981)
mask4 = data['Year'].between(1989, 1996)

# apply our mask
arms_1990 = data[mask1 & mask2]
arms_range1 = data[mask1 & mask3].head(20)
```

```
arms_range2 = data[mask1 & mask4].head(20)
arms_1990.head(5)
```

```
Out[121]:
```

	CountryName	CountryCode	\
4670076	United States	USA	
4465903	United Kingdom	GBR	
4462962	Germany	DEU	
4453239	France	FRA	
4375760	China	CHN	

	IndicatorName	IndicatorCode	Year	\
4670076	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4465903	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4462962	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4453239	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4375760	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	

	Value
4670076	1.076200e+10
4465903	1.877000e+09
4462962	1.834000e+09
4453239	1.698000e+09
4375760	9.410000e+08

```
In [122]: arms_range1
```

```
Out[122]:
```

	CountryName	CountryCode	\
4692070	United States	USA	
4553128	France	FRA	
4496997	United Kingdom	GBR	
4475814	Germany	DEU	
4452661	Italy	ITA	
4355588	Netherlands	NLD	
4323869	China	CHN	
4323240	Switzerland	CHE	
4240877	Poland	POL	
4211955	Norway	NOR	
4178697	Israel	ISR	
4178696	Arab World	ARB	
4117226	Sweden	SWE	
4109226	Korea, Rep.	KOR	
4109194	Spain	ESP	
4104846	Canada	CAN	
4083097	Libya	LBY	
4061197	Macedonia, FYR	MKD	
4038655	Egypt, Arab Rep.	EGY	
4031566	Austria	AUT	

		IndicatorName	IndicatorCode	Year	\
4692070	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4553128	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4496997	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4475814	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4452661	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4355588	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4323869	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4323240	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4240877	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4211955	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4178697	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4178696	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4117226	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4109226	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4109194	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4104846	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4083097	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4061197	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4038655	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		
4031566	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1981		

	Value
4692070	1.345100e+10
4553128	3.786000e+09
4496997	2.403000e+09
4475814	2.029000e+09
4452661	1.690000e+09
4355588	8.120000e+08
4323869	6.420000e+08
4323240	6.390000e+08
4240877	3.460000e+08
4211955	2.780000e+08
4178697	2.170000e+08
4178696	2.170000e+08
4117226	1.380000e+08
4109226	1.300000e+08
4109194	1.300000e+08
4104846	1.260000e+08
4083097	1.070000e+08
4061197	9.100000e+07
4038655	7.700000e+07
4031566	7.300000e+07

0.15.1 Histogram of Top 20 arms contributors from 1973-1981

In [113]: *# let's plot a histogram of the arms exported per capita by country*

```

# subplots returns a tuple with the figure, axis attributes.
fig, ax = plt.subplots()

ax.annotate("USA",
            xy=(20, 25), xycoords='data',
            xytext=(15, 5), textcoords='data',
            arrowprops=dict(arrowstyle="->",
                            connectionstyle="arc3"),
            )

plt.hist(arms_range1['Value'], 10, normed=False, facecolor='green')

plt.xlabel(arms_range1['IndicatorName'].iloc[0])
plt.ylabel('# of Countries (duplicated each year)')
plt.title('Histogram of Arms exported Per Capita (1973-1981)')

plt.axis([0, 1.5e10, 0, 50])
plt.grid(True)

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

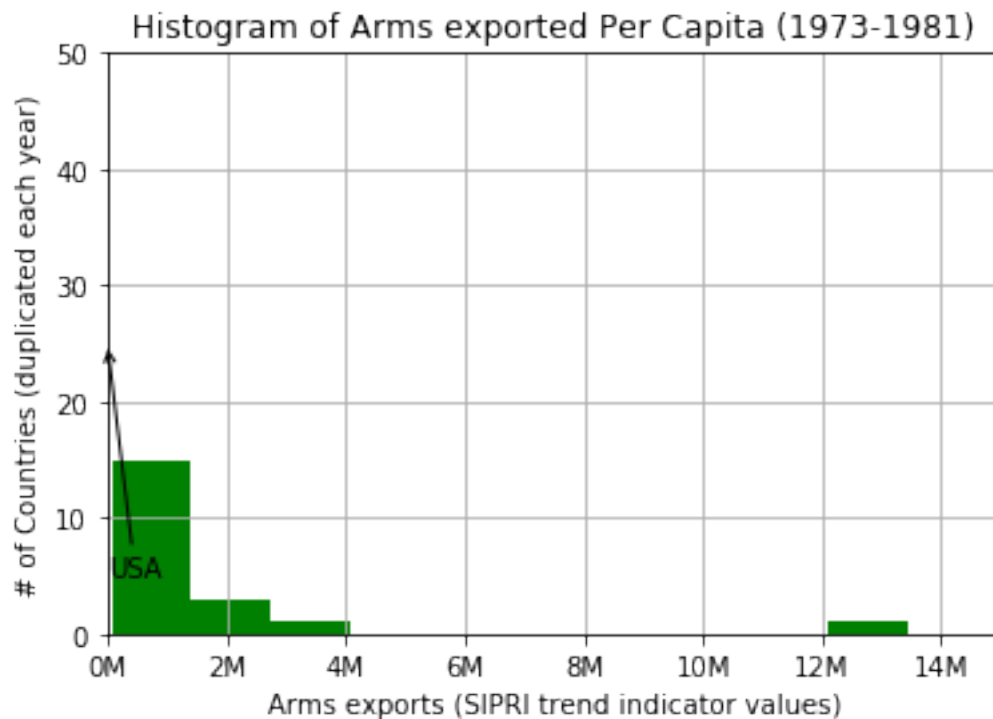
def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.xaxis.set_major_formatter(formatter)

plt.show()

```



In [88]: arms_range2

Out [88]:

	CountryName	CountryCode	\
4696661	United States	USA	
4694834	United States	USA	
4685231	United States	USA	
4676393	United States	USA	
4675317	United States	USA	
4673572	United States	USA	
4670520	United States	USA	
4670076	United States	USA	
4556602	Russian Federation	RUS	
4544913	Russian Federation	RUS	
4544264	United Kingdom	GBR	
4541527	Russian Federation	RUS	
4513924	Germany	DEU	
4507509	Russian Federation	RUS	
4502729	Germany	DEU	
4486259	France	FRA	
4472323	Germany	DEU	
4467214	France	FRA	
4465903	United Kingdom	GBR	
4462962	Germany	DEU	

	IndicatorName	IndicatorCode	Year	\
4696661	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1992	
4694834	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1993	
4685231	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1991	
4676393	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1994	
4675317	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1989	
4673572	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1995	
4670520	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1996	
4670076	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4556602	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1995	
4544913	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1996	
4544264	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1989	
4541527	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1993	
4513924	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1994	
4507509	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1992	
4502729	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1991	
4486259	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1989	
4472323	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1996	
4467214	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1996	
4465903	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	
4462962	Arms exports (SIPRI trend indicator values)	MS.MIL.XPRT.KD	1990	

	Value
4696661	1.410700e+10
4694834	1.383600e+10
4685231	1.254000e+10
4676393	1.146100e+10
4675317	1.134200e+10
4673572	1.114600e+10
4670520	1.080800e+10
4670076	1.076200e+10
4556602	3.900000e+09
4544913	3.539000e+09
4544264	3.520000e+09
4541527	3.442000e+09
4513924	2.751000e+09
4507509	2.613000e+09
4502729	2.516000e+09
4486259	2.207000e+09
4472323	1.974000e+09
4467214	1.896000e+09
4465903	1.877000e+09
4462962	1.834000e+09

0.15.2 Histogram of Top 20 contributors from 1989-1996

In [119]: *# let's plot a histogram of the arms exported per capita by country*

```

# subplots returns a tuple with the figure, axis attributes.
fig, ax = plt.subplots()

ax.annotate("USA",
            xy=(10e9, 5), xycoords='data',
            xytext=(8e9, 5), textcoords='data',
            arrowprops=dict(arrowstyle="->",
                            connectionstyle="arc3"),
            )

plt.hist(arms_range2['Value'], 10, normed=False, facecolor='green')

plt.xlabel(arms_range2['IndicatorName'].iloc[0])
plt.ylabel('# of Countries (duplicated each year)')
plt.title('Histogram of Arms exported Per Capita (1973-1981)')

plt.axis([0, 1.5e10, 0, 20])
plt.grid(True)

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

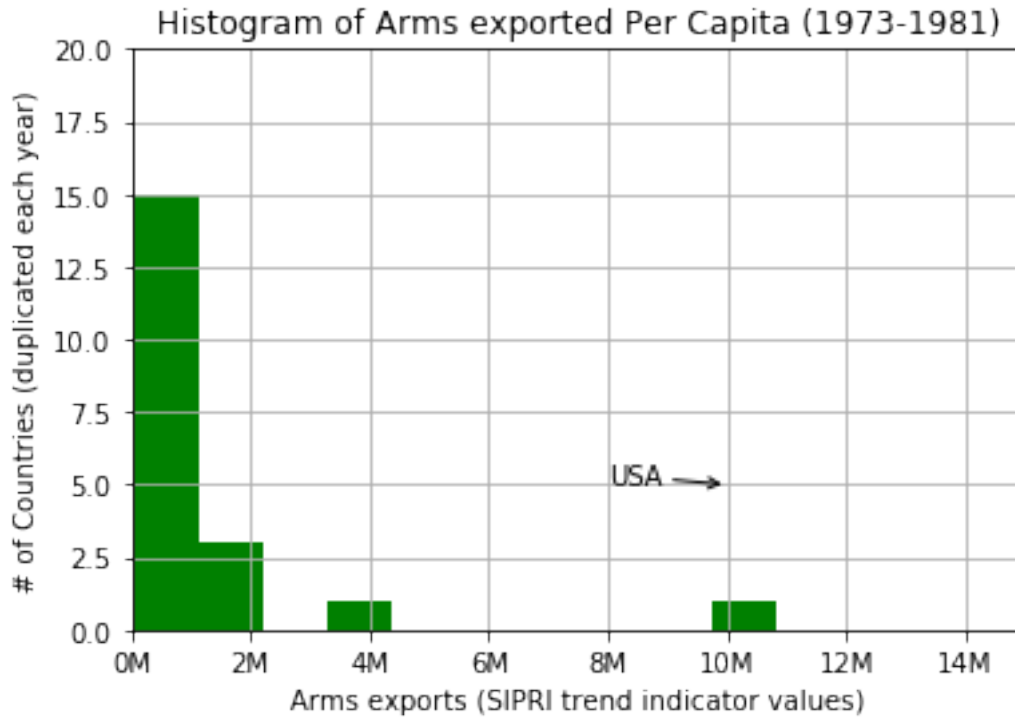
def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.xaxis.set_major_formatter(formatter)

plt.show()

```



0.16 Histogram of arms exports per capita by country

In [52]: # let's plot a histogram of the arms exported per capita by country

```
# subplots returns a tuple with the figure, axis attributes.
fig, ax = plt.subplots()

ax.annotate("USA",
            xy=(12e9, 25), xycoords='data',
            xytext=(6e9, 500), textcoords='data',
            arrowprops=dict(arrowstyle="->",
                            connectionstyle="arc3"),
            )

plt.hist(arms_stage['Value'], 10, normed=False, facecolor='green')

plt.xlabel(arms_stage['IndicatorName'].iloc[0])
plt.ylabel('# of Countries (duplicated each year)')
plt.title('Histogram of Arms exported Per Capita (1960-2014)')

plt.axis([0, 1.5e10, 0, 2000])
plt.grid(True)
```

```

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

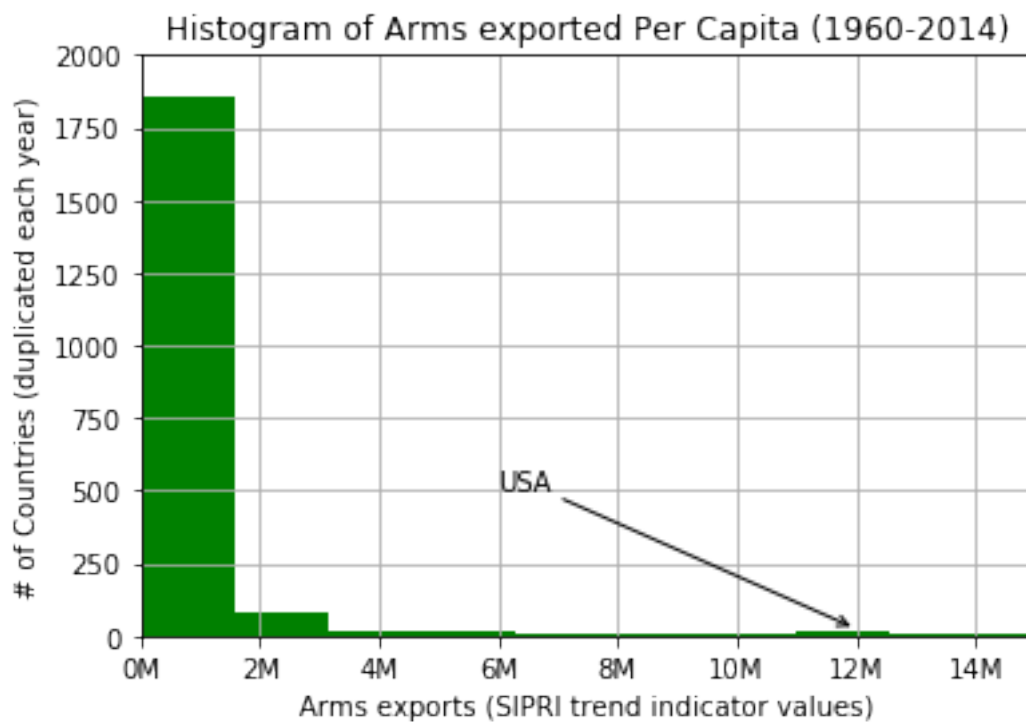
def millions(x, pos):
    'The two args are the value and tick position'
    return '{:.0f}M'.format(x*1e-9)

formatter = FuncFormatter(millions)

ax.xaxis.set_major_formatter(formatter)

plt.show()

```



```
In [34]: print(len(arms_stage))
```

2024

So the USA, at ~12M arms is an outlier, as most countries have 0-1M arms exported from 1960-2014