International debt dataset from the World Bank

- **Debt indicators are metrics that are used to assess a country's debt position and its ability to manage debt. These indicators are important because a high level of debt can make a country vulnerable to economic and financial instability. It is important to note that this is just one of many debt indicators that can be used to evaluate a country's financial stability and potential for growth.**
- **In this Jupyter notebook, I will be conducting an analysis of the international debt dataset sourced from the World Bank. It is worth noting that the dataset solely comprises of debt from developing countries, and as such, excludes debt from developed countries.**

In [58]:
```
#dependencies and setup
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import textwrap


#file to load
debt=pd.read_csv("international_debt.csv")
```

In [14]:
```
#create a summary of the data
debt.head()
#This will show the 5 records from the data
```

Out[14]:

	country_name	country_code	indicator_name	indicator_code	debt
0	Afghanistan	AFG	Disbursements on external debt, long-term (DIS...	DT.DIS.DLXF.CD	72894453.7
1	Afghanistan	AFG	Interest payments on external debt, long-term ...	DT.INT.DLXF.CD	53239440.1
2	Afghanistan	AFG	PPG, bilateral (AMT, current US$)	DT.AMT.BLAT.CD	61739336.9
3	Afghanistan	AFG	PPG, bilateral (DIS, current US$)	DT.DIS.BLAT.CD	49114729.4
4	Afghanistan	AFG	PPG, bilateral (INT, current US$)	DT.INT.BLAT.CD	39903620.1

In [3]:
```
# To know what kind of data type we have in the dataset
debt.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2357 entries, 0 to 2356
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   country_name    2357 non-null   object 
 1   country_code    2357 non-null   object 
 2   indicator_name  2357 non-null   object 
 3   indicator_code  2357 non-null   object 
 4   debt            2357 non-null   float64
dtypes: float64(1), object(4)
memory usage: 92.2+ KB
```

Total number of country

- **Looking at the top 5 of the data, we can say that one country can have multiple debt indicator, but we cannot really say how many countries are included in the dataset.**
- **To know how many counries are in the dataset, we need to use nunique() function in Python. This will show the unique country name from the dataset.**

In [4]:
```
totalCountry=debt["country_name"].nunique()
print("Total number of country in the dataset:", totalCountry)
```

```
Total number of country in the dataset: 124
```

Total debt from 124 countries

In [5]:
```
totalDebt=debt["debt"].sum()
print("Total debt from all 124 countries: ","${:,.2f}".format(totalDeb
```

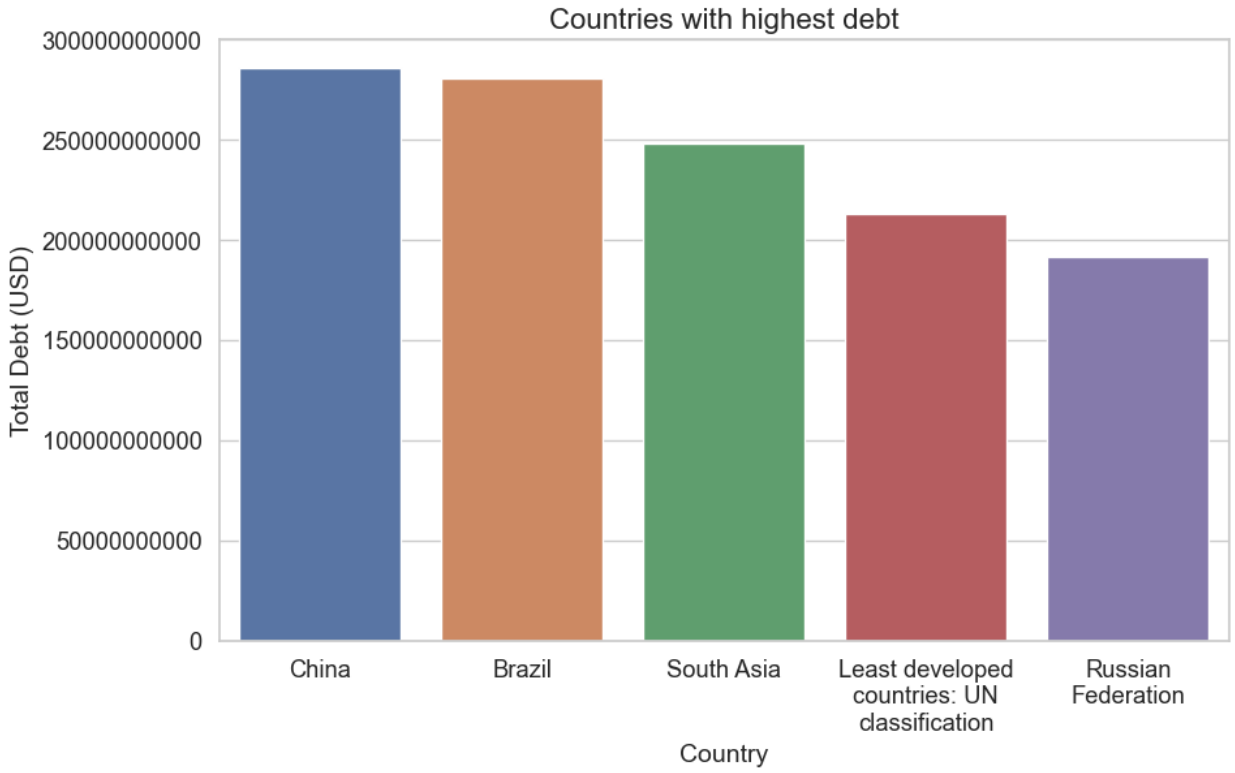
```
Total debt from all 124 countries:  $3,079,734,487,675.80
```

Which country has the highest total debt in 124 coutries?

In [67]:
```
totalDebt = debt.groupby('country_name')['debt'].sum()
top5 = totalDebt.nlargest(5)
top5_df = top5.to_frame().reset_index()
top5_df_str = top5_df.to_string(index=False,
                                float_format='{:,.2f}'.format)
wrap_width = 15
top5_df['country_name'] = top5_df['country_name']
.apply(lambda x: '\n'.join(textwrap.wrap(x, width=wrap_width)))
print(top5_df_str)
```

```
                              country_name                debt
                                     China 285,793,494,734.20
                                    Brazil 280,623,966,140.80
                                South Asia 247,608,723,990.60
Least developed countries: UN classification 212,880,992,791.90
                            Russian Federation 191,289,057,259.20
```

In [70]:
```
##Data Visualization
sns.set_style("whitegrid")
plt.figure(figsize=(10, 6))
sns.barplot(x='country_name', y='debt', data=top5_df)
plt.title('Countries with highest debt', fontsize=16)
plt.xlabel('Country', fontsize=14)
plt.ylabel('Total Debt (USD)', fontsize=14)
plt.ticklabel_format(style='plain', axis='y')
for p, label in zip(ax.patches, top5_df['country_name']):
    ax.text(x=p.get_x() + p.get_width() / 2, y=p.get_y() +
            p.get_height() / 2, s=label, ha='center', va='center')
plt.show()
```



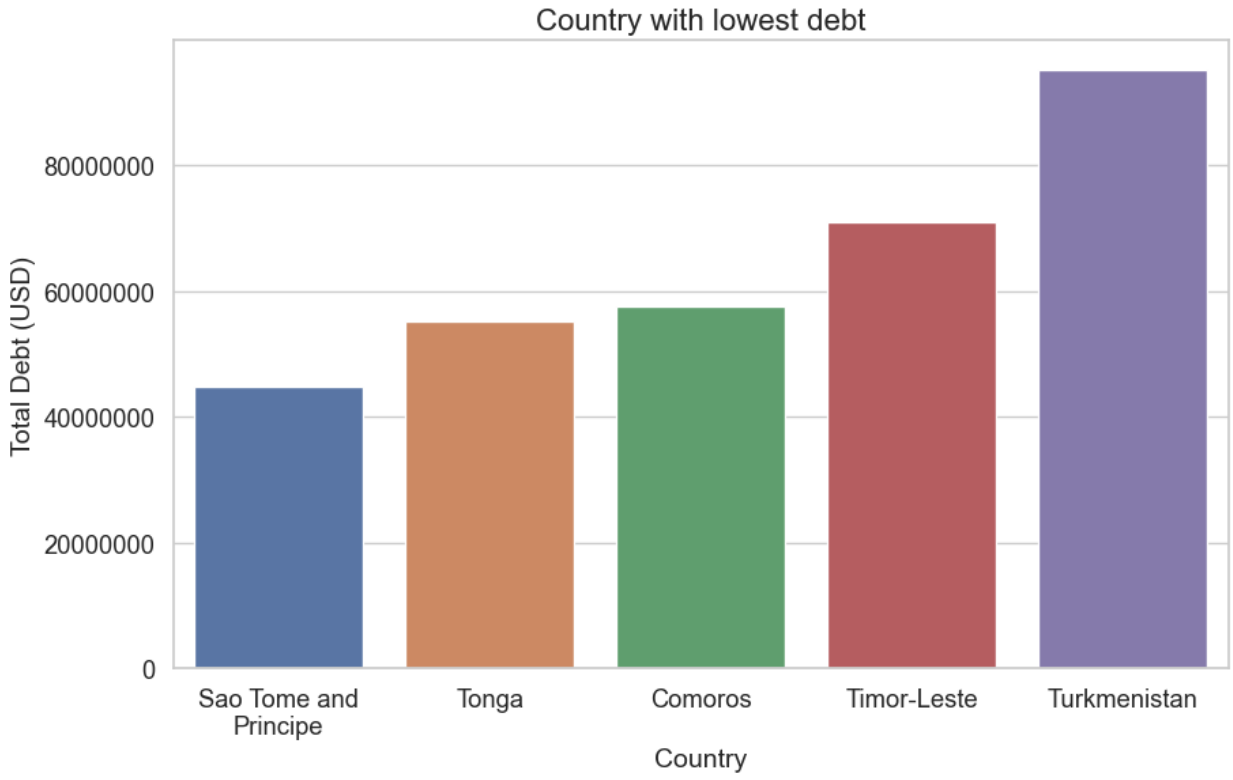
- **China has the biggest debt compare to other developing countries.**
- **Now that we have established the country with the highest debt, we can investigate which of the 124 countries has the lowest debt. This is of particular interest, as lower national debt is commonly perceived as indicative of greater financial stability and lower risk for investors.**

Country with lowest national debt?

In [66]:
```
totalDebtLeast=debt.groupby('country_name')["debt"].sum()
least5=totalDebtLeast.nsmallest(5)
least5_df=least5.to_frame().reset_index()
least5_df_str = least5_df.to_string(index=False,
                                    float_format='{:,.2f}'.format)
wrap_width = 15
least5_df['country_name'] = least5_df['country_name'].
apply(lambda x: '\n'.join(textwrap.wrap(x, width=wrap_width)))
print(least5_df_str)
```

```
         country_name          debt
Sao Tome and Principe 44,798,032.50
                Tonga 55,209,304.80
              Comoros 57,568,483.20
          Timor-Leste 71,000,959.20
         Turkmenistan 95,135,629.30
```

In [69]:
```
##Data Visualization
sns.set_style("whitegrid")
plt.figure(figsize=(10, 6))
sns.barplot(x='country_name', y='debt', data=least5_df)
plt.title('Country with lowest debt', fontsize=16)
plt.xlabel('Country', fontsize=14)
plt.ylabel('Total Debt (USD)', fontsize=14)
plt.ticklabel_format(style='plain', axis='y')
for p, label in zip(ax.patches, top5_df['country_name']):
    ax.text(x=p.get_x() + p.get_width() / 2, y=p.get_y() +
            p.get_height() / 2, s=label, ha='center', va='center')
plt.show()
```



- **We will now proceed to examine various types of debt indicators, as they provide valuable insights into the creditworthiness of countries and their level of safety as borrowers.**

Median debt in different debt indicators

In [56]:
```
medianDebtIndicators=debt.groupby('indicator_code')['debt'].median()
medianDebtIndicators=medianDebtIndicators.sort_values(ascending=False)
# apply the results into number format
medianDebtIndicators = medianDebtIndicators.
apply(lambda x: "${:,.2f}".format(x))
# print only top 5
medianDebtIndicators=medianDebtIndicators.head(5)
print(medianDebtIndicators)
```

```
indicator_code
DT.AMT.DPNG.CD    $969,200,000.00
DT.AMT.DLXF.CD    $709,976,912.45
DT.DIS.DLXF.CD    $473,703,814.30
DT.DIS.OFFT.CD    $442,048,940.25
DT.DIS.MLAT.CD    $246,739,145.25
Name: debt, dtype: object
```

- **Indicator DT.AMT.DPNG.CD have the highest debt. This debt indicators means that a country is more vulnerable to external shocks or changes in global economic conditions, which could have a negative impact on its economy.**
- **Since China holds the highest total national debt among 124 countries, our focus will be on this country to examine the types of debt it possesses. This is because we are interested in assessing China's economic performance.**

Number of debt China have

In [31]:
```
chinaData=debt[['country_name','indicator_code','indicator_name','debt
chinaDebt=chinaData[chinaData['country_name'] == "China"]
print("In total, China have", chinaDebt['debt'].count(),
      "different kind of debt.")
```

```
In total, China have 24 different kind of debt.
```

What kind of debt does China have?

In [32]:
```
chinaDebt.sort_values(by=['debt'],ascending=False).head(5)
```

Out[32]:

	country_name	indicator_code	indicator_name	debt
462	China	DT.AMT.DLXF.CD	Principal repayments on external debt, long-te...	9.621862e+10
463	China	DT.AMT.DPNG.CD	Principal repayments on external debt, private...	7.239299e+10
441	China	DT.INT.DLXF.CD	Interest payments on external debt, long-term ...	1.786655e+10
440	China	DT.DIS.DLXF.CD	Disbursements on external debt, long-term (DIS...	1.569256e+10
459	China	DT.AMT.PRVT.CD	PPG, private creditors (AMT, current US$)	1.467746e+10

- **Based on the data provided, it can be concluded that China had significant external debt as evidenced by the large values for principal repayments and interest payments on external debt.**
- **China also received disbursements on external debt, although the amount was lower than the principal repayments. The country also had a significant amount of debt from private creditors, although this was lower than the amount owed for long-term external debt.**