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In [1]: import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.dates as mdates
import seaborn as sns
from matplotlib.ticker import FuncFormatter
import warnings
warnings.filterwarnings("ignore")
```

```
In [2]: # Load the data into a pandas DataFrame
data = pd.read_csv('ELECTROL BOND DONORS.csv')

In [3]: # Display the first few rows of the DataFrame to understand its structure
print(data.head())
```

```
In [4]: # Summary statistics
summary_statistics = data.describe()

pd.set_option('display.float_format', '{:.2f}'.format)

print("Summary Statistics:")
print(summary_statistics)
```

```
In [5]: # Count the number of purchases by purchaser name
purchases_by_purchaser = data['Purchaser Name'].value_counts()
print("\nPurchases by Purchaser:")
print(purchases_by_purchaser)
```

```
Purchases by Purchaser:
Purchaser Name
FUTURE GAMING AND HOTEL SERVICES PR      1208
MEGHA ENGINEERING AND INFRASTRUCTURES LI MITED      821
QWIKSUPPLYCHAINPRIVATELIMITED      410
HALDIA ENERGY LIMITED      395
VEDANTA LIMITED      386
...
MR. SAMEER BHATIA      1
B.DAS AND ASSOCIATES PVT. LTD.      1
J B ENTERPRISE      1
RAVALIA SHEMA WIND ENERGY PVT LTD      1
CONRUANT SURINDER RAO      1
Name: count, Length: 1316, dtype: int64
```

```
In [6]: # Visualization of the top 10 bond purchasers by quantity of bonds:

top_10_purchasers = purchases_by_purchaser.head(10)

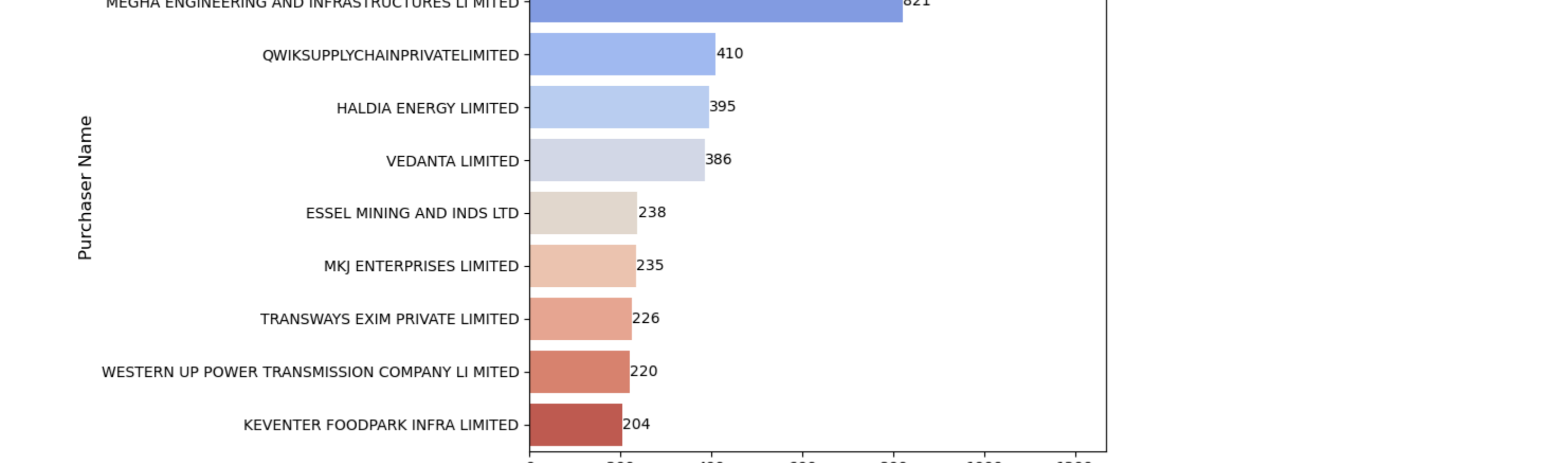
# Set the figure size
plt.figure(figsize=(10, 6))

# Create a bar plot for the top 10 purchasers
ax = sns.barplot(x=top_10_purchasers.values, y=top_10_purchasers.index, palette='coolwarm')

# Customize the plot
plt.title('Top 10 Purchasers by Number of Purchases', fontsize=16)
plt.xlabel('Number of Purchases', fontsize=12)
plt.ylabel('Purchaser Name', fontsize=12)

# Add data labels on the bars
for index, value in enumerate(top_10_purchasers.values):
    ax.text(value + 0.1, index, f'{value}', va='center', ha='left', fontsize=10, color='black') # Position and format

# Show the plot
plt.tight_layout()
plt.show()
```



```
In [7]: # Total value of the bonds purchased
total_bonds_purchased = data['Denomination'].sum()
formatted_total = f"₹ {total_bonds_purchased:,.0f}"

print(f"\nTotal Value of the Bonds Purchased: ₹ {formatted_total}")
```

```
Total Value of the Bonds Purchased: ₹ 121,555,132,000

In [8]: # Analyze trends over time (assuming 'Date of Purchase' is in a datetime format)
data['Date of Purchase'] = pd.to_datetime(data['Date of Purchase'])
data['Year'] = data['Date of Purchase'].dt.year
data['Month'] = data['Date of Purchase'].dt.month
```

```
In [9]: # Number of purchases per year
purchases_by_year = data['Year'].value_counts().sort_index()
print("\nPurchases by Year:")
print(purchases_by_year)
```

```
Purchases by Year:
Year
2019    3154
2020     460
2021    2647
2022    5314
2023    6399
2024     891
Name: count, dtype: int64
```

```
In [10]: # Number of purchases per month
purchases_by_month = data.groupby(['Year', 'Month']).size()
print("\nPurchases by Month:")
print(purchases_by_month)
```

```
Purchases by Month:
Year Month
2019  4      1335
      5      1187
      7       101
      10     531
2020  1       139
      10     321
2021  1       151
      4       974
      7       465
      10    1057
2022  1      2068
      4       811
      7       480
      10     741
      11     954
      12     260
2023  1       437
      4      1470
      7      1371
      10     2012
      11    1109
2024  1       897
dtype: int64
```

```
In [11]: # Visualization of Number of Purchases of Months by Months and Years :

purchases_by_month_df = purchases_by_month.reset_index(name='Count')

purchases_by_month_df['Date'] = pd.to_datetime(purchases_by_month_df[['Year', 'Month']].assign(Day=1))

purchases_by_month_df.set_index('Date', inplace=True)

plt.figure(figsize=(12, 6))

plt.plot(purchases_by_month_df.index, purchases_by_month_df['Count'], marker='o', linestyle='-', color='b')

plt.title('Purchases by Months and Years', fontsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Number of Purchases', fontsize=12)

plt.gca().xaxis.set_major_locator(mdates.YearLocator())
plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y'))
plt.gcf().autofmt_xdate()

for x, y in zip(purchases_by_month_df.index, purchases_by_month_df['Count']):
    plt.text(x + 1, str(y), ha='center', va='bottom', fontsize=9, color='black') # Increased the offset

plt.grid()

plt.tight_layout()
plt.show()
```



```
In [12]: # Top 10 Purchasers by Value

purchases_by_purchaser = data.groupby('Purchaser Name')['Denomination'].sum()
top_10_purchasers = purchases_by_purchaser.nlargest(10)
top_10_purchasers_formatted = top_10_purchasers.apply(lambda x: f"₹ {x:,.0f}")

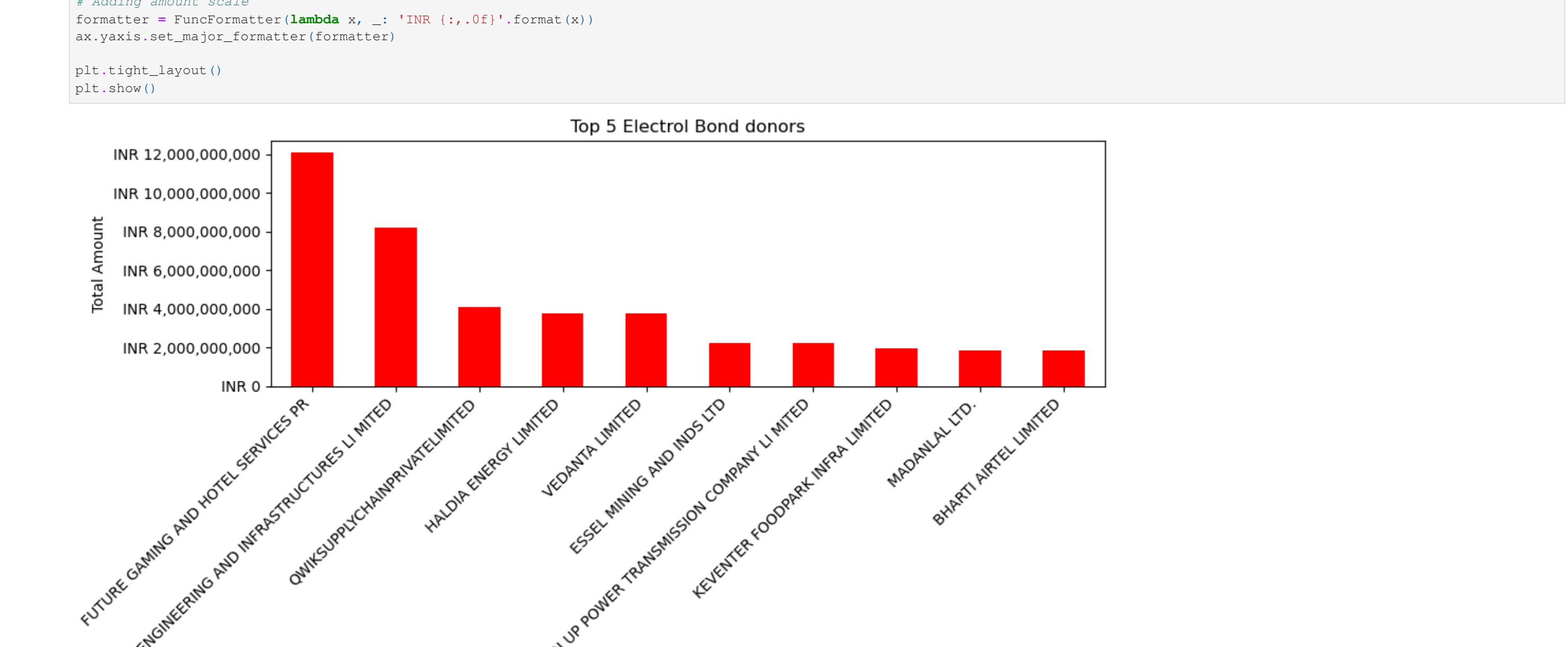
print(top_10_purchasers_formatted)
```

```
Purchaser Name
FUTURE GAMING AND HOTEL SERVICES PR      ₹ 12,080,000,000
MEGHA ENGINEERING AND INFRASTRUCTURES LI MITED      ₹ 8,210,000,000
QWIKSUPPLYCHAINPRIVATELIMITED      ₹ 4,100,000,000
HALDIA ENERGY LIMITED      ₹ 3,770,000,000
VEDANTA LIMITED      ₹ 3,756,500,000
ESSEL MINING AND INDS LTD      ₹ 2,245,000,000
WESTERN UP POWER TRANSMISSION COMPANY LI MITED      ₹ 2,200,000,000
KEVENTER FOODPARK INFRA LIMITED      ₹ 1,950,000,000
MADANLAL LTD.      ₹ 1,855,000,000
BHARTI AIRTEL LIMITED      ₹ 1,830,000,000
Name: Denomination, dtype: object
```

```
In [13]: # Plotting
plt.figure(figsize=(10, 6))
ax = top_10_purchasers.plot(kind='bar', color='red')
plt.title('Top 5 Electrol Bond donors')
plt.xlabel('Purchaser Name')
plt.ylabel('Total Amount')
plt.xticks(rotation=45, ha='right')

# Adding amount scale
formatter = FuncFormatter(lambda x, _: f'INR {x:,.0f}'.format(x))
ax.yaxis.set_major_formatter(formatter)

plt.tight_layout()
plt.show()
```



```
In [14]: # Load the data into a pandas DataFrame
data_donations = pd.read_csv('PARTY-WISE ELECTROL BOND DONATION.csv')
```

```
In [15]: # Display the first few rows of the DataFrame to understand its structure
print(data_donations.head())
```

```
Date of Encashment      Name of the Political Party      Denomination \
0      12/Apr/2019      ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      1000000
1      12/Apr/2019      ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      1000000
2      12/Apr/2019      ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      1000000
3      12/Apr/2019      ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      1000000
4      12/Apr/2019      ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      1000000
```

```
In [16]: # Summary statistics
summary_statistics = data_donations.describe()

pd.set_option('display.float_format', '{:.2f}'.format)

print("Summary Statistics:")
print(summary_statistics)
```

```
Summary Statistics:
Denomination      Unnamed: 3
count      20421.00      0.00
mean      6255200.67      NaN
std      4576321.21      NaN
min      1000.00      NaN
25%      1000000.00      NaN
50%      10000000.00      NaN
75%      10000000.00      NaN
max      10000000.00      NaN
```

```
In [17]: # Number of Bonds Donated to each Political Party
donations_by_party = data_donations['Name of the Political Party'].value_counts()
print("\nPARTY-WISE ELECTROL BOND DONATION :")
print(donations_by_party)
```

```
NAME OF THE POLITICAL PARTY
Bhartiya Janta Party      8633
ALL INDIA TRINAMOL CONGRESS      3305
PRESIDENT, ALL INDIA CONGRESS COMMITTEE      3146
BHARAT RASHTRA SAMITHI      1806
BIJU JANATA DAL      861
DMK PARTY IN PARLIAMENT      648
YSR CONGRESS PARTY (YUVAJANA SRAMIKA R      472
SHIVSENA (POLITICAL PARTY)      354
TELUUGU DESAM PARTY      279
AAM AADMI PARTY      245
RASTRIYA JANATA DAL      116
JANATA DAL ( SECULAR )      75
SIKKIM KRANTIKARI MORCHA      50
ADYAKSHA SAMAJVADI PARTY      46
JHARKHAND MUKTI MORCHA      45
JANASENA PARTY      39
ALL INDIA ANNA DRAVIDA MUNNETRA KAZHAGAM      38
SHIKHOMANI AKALI DAL      33
MAHARASHTRAMUKTI GOBHTAK PARTY      28
GOA FORWARD PARTY      17
BIHAR PRADESH JANATA DAL (UNITED)      14
SIKKIM DEMOCRATIC FRONT      10
JAMMU AND KASHMIR NATIONAL CONFERENCE      5
NATIONALIST CONGRESS PARTY MAHARASHTRA PRADESH      5
SHIVSENA      1
RASTRIYA JANATA DAL      1
Name: count, dtype: int64
```

```
In [18]: # Visualisation of Top 10 Political Parties by Number of Bonds Donated

top_10_donations_by_party = donations_by_party.head(10)

# Set the figure size
plt.figure(figsize=(10, 6))

# Create a bar plot
ax = sns.barplot(x=top_10_donations_by_party.values, y=top_10_donations_by_party.index, palette='viridis')

# Customize the plot
plt.title('Top 10 Political Parties by Number of Bonds Donated', fontsize=16)
plt.xlabel('Number of Bonds Donated', fontsize=12)
plt.ylabel('Political Party', fontsize=12)

# Add data labels on the bars
for index, value in enumerate(top_10_donations_by_party.values):
    plt.text(value, index, f'{value}', va='center', ha='left', fontsize=10, color='black') # Position and format

# Show the plot
plt.tight_layout()
plt.show()
```



```
In [19]: # Top 10 Parties by Total Value of Donations
amount_of_donations_by_party = data_donations.groupby('Name of the Political Party')['Denomination'].sum()
top_10_donations_by_party = amount_of_donations_by_party.nlargest(10)

def return_in_crores(amount):
    return f"₹ {amount / 1000000000:,.2f} Cr"

top_10_donations_by_party_formatted = top_10_donations_by_party.apply(format_in_crores)

print(top_10_donations_by_party_formatted)
```

```
Name of the Political Party
Bhartiya Janta Party      ₹ 6,060.51 Cr
ALL INDIA TRINAMOL CONGRESS      ₹ 1,609.53 Cr
PRESIDENT, ALL INDIA CONGRESS COMMITTEE      ₹ 1,421.87 Cr
BHARAT RASHTRA SAMITHI      ₹ 1,214.71 Cr
BIJU JANATA DAL      ₹ 775.50 Cr
DMK PARTY IN PARLIAMENT      ₹ 639.00 Cr
YSR CONGRESS PARTY (YUVAJANA SRAMIKA R      ₹ 337.00 Cr
TELUUGU DESAM PARTY      ₹ 218.88 Cr
SHIVSENA (POLITICAL PARTY)      ₹ 158.38 Cr
RASTRIYA JANATA DAL      ₹ 72.50 Cr
Name: Denomination, dtype: object
```

```
In [20]: # Visualization of Top 10 Parties by Total Value of Donations

plt.figure(figsize=(10, 6))

ax = sns.barplot(x=top_10_donations_by_party.values, y=top_10_donations_by_party.index, palette='coolwarm')

plt.title('Top 10 Political Parties by Total Value of Donations', fontsize=16)
plt.xlabel('Total Value of Donations (in ₹ Crores)', fontsize=12)
plt.ylabel('Political Party', fontsize=12)

# Add data labels on the bars
for index, value in enumerate(top_10_donations_by_party.values):
    ax.text(value + 0.1, index, format_in_crores(value), va='center', ha='left', fontsize=10, color='black') # Position and format

# Show the plot
plt.tight_layout()
plt.show()
```

