```python
import pandas as pd
import matplotlib.pyplot as plt

# Load data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Split World total and country data
total_imports = df[df["Exporters"] == "World"].iloc[0, 1:]
exporters_df = df[df["Exporters"] != "World"].copy()

# Calculate dependency (% of total)
for year in total_imports.index:
    exporters_df[f"{year}_dependency"] = (
        exporters_df[year] / total_imports[year] * 100
    ).round(2)

# Prepare for plotting
melted = exporters_df.melt(
    id_vars="Exporters",
    value_vars=[f"{year}_dependency" for year in total_imports.index],
    var_name="Year",
    value_name="Dependency (%)"
)
melted["Year"] = melted["Year"].str.extract(r"(\d{4})")

# Plot
plt.figure(figsize=(10, 6))
for exporter in melted["Exporters"].unique():
    data = melted[melted["Exporters"] == exporter]
    plt.plot(data["Year"], data["Dependency (%)"], marker='o',
label=exporter)

plt.title("Nigeria's Import Dependency by Exporter (2019–2023)",
fontsize=14, weight='bold')
plt.xlabel("Year")
plt.ylabel("Import Dependency (%)")
plt.grid(True)
plt.legend(title="Exporter", bbox_to_anchor=(1.05, 1), loc='upper
left')
plt.tight_layout()
plt.show()
```
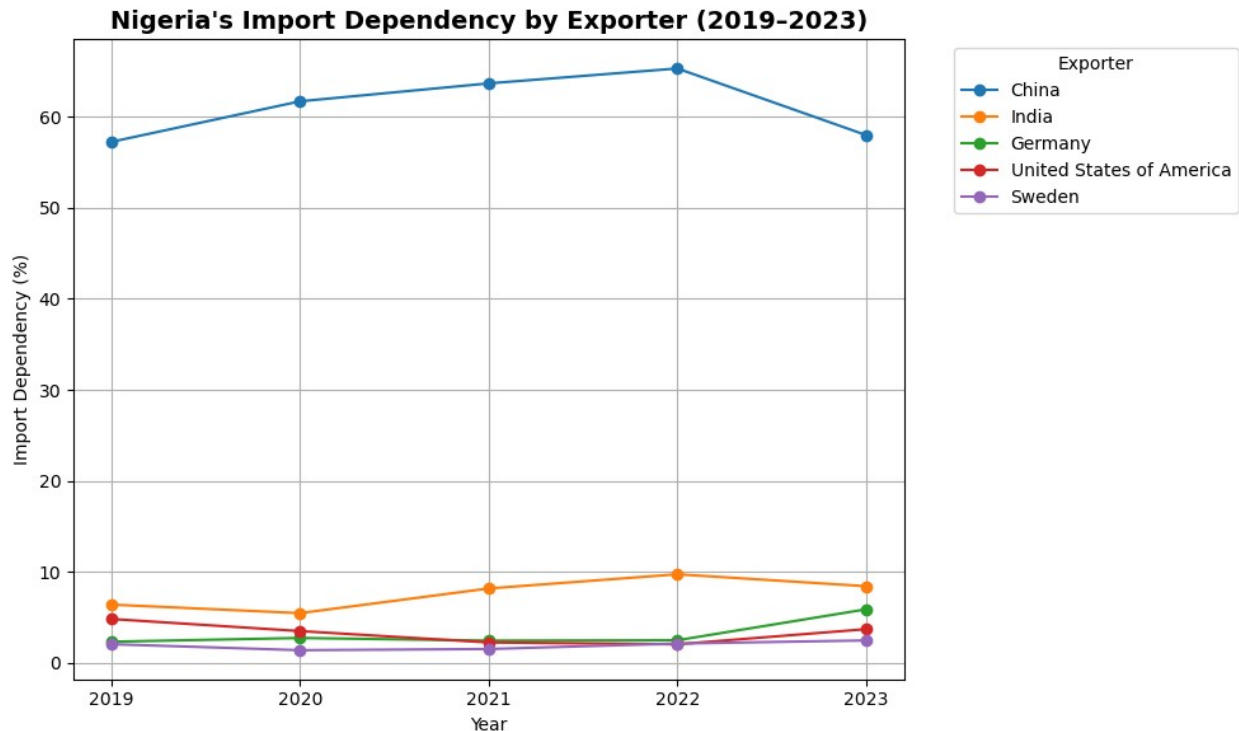
Nigeria's Import Dependency by Exporter (2019-2023)


```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Split total (World) and exporters
total_imports = df[df["Exporters"] == "World"].iloc[0, 1:]
exporters_df = df[df["Exporters"] != "World"].copy()

# Calculate dependency as percentage share of total imports
for year in total_imports.index:
    exporters_df[f"{year}_dependency"] = (
        exporters_df[year] / total_imports[year] * 100
    ).round(2)

# Prepare data for plotting
dependency_cols = [f"{year}_dependency" for year in
total_imports.index]
melted = exporters_df.melt(
    id_vars="Exporters",
    value_vars=dependency_cols,
    var_name="Year",
    value_name="Dependency (%)"
)

# Clean year format
```
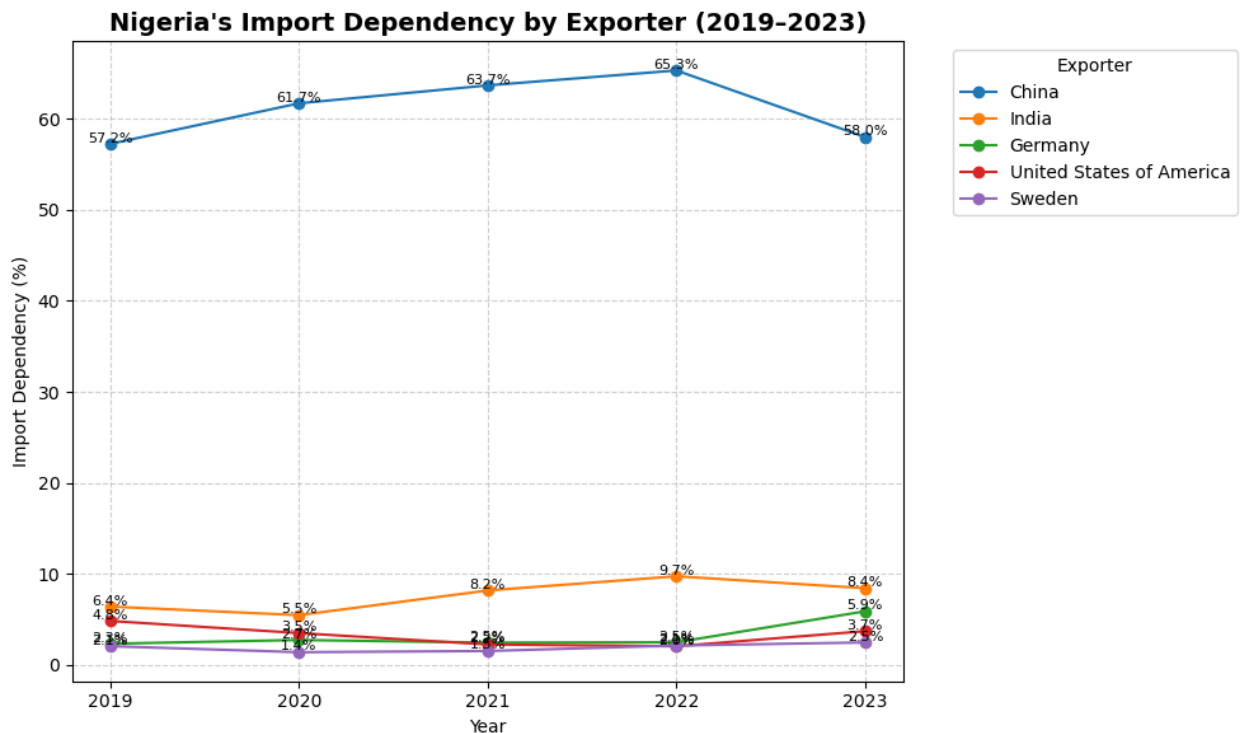
```python
melted["Year"] = melted["Year"].str.extract(r"(\d{4})")

# Plot
plt.figure(figsize=(10, 6))
for exporter in melted["Exporters"].unique():
    data = melted[melted["Exporters"] == exporter]
    plt.plot(data["Year"], data["Dependency (%)"], marker='o',
label=exporter)
    # Add data labels
    for i, row in data.iterrows():
        plt.text(row["Year"], row["Dependency (%)"] + 0.2,
f'{row["Dependency (%)"]:.1f}%', ha='center', fontsize=8)

plt.title("Nigeria's Import Dependency by Exporter (2019–2023)",
fontsize=14, weight='bold')
plt.xlabel("Year")
plt.ylabel("Import Dependency (%)")
plt.grid(True, linestyle='--', alpha=0.6)
plt.legend(title="Exporter", bbox_to_anchor=(1.05, 1), loc='upper
left')
plt.tight_layout()
plt.show()
```


Nigeria's Import Dependency by Exporter (2019-2023)

```python
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
```

```python
# Load the cleaned dataset
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Filter exporters only
exporters_df = df[df["Exporters"] != "World"].copy()
year_columns = ['2019', '2020', '2021', '2022', '2023']

# Calculate year-over-year percentage change
pct_change_df = exporters_df[year_columns].pct_change(axis=1) * 100

# Calculate standard deviation (volatility)
exporters_df["Volatility (%)"] = pct_change_df.std(axis=1).round(2)

# Sort by volatility
df_sorted = exporters_df.sort_values(by="Volatility (%)",
ascending=False)

# Plot
plt.figure(figsize=(10, 6))
bars = plt.bar(df_sorted["Exporters"], df_sorted["Volatility (%)"],
color='orange')

# Add data labels
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, height, f'{height:.1f}
%', ha='center', va='bottom', fontsize=9)

plt.title("Volatility in Nigeria's Imports by Country (2019–2023)",
fontsize=14, weight='bold')
plt.ylabel("Volatility (% Std. Dev. of Yearly Change)")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```
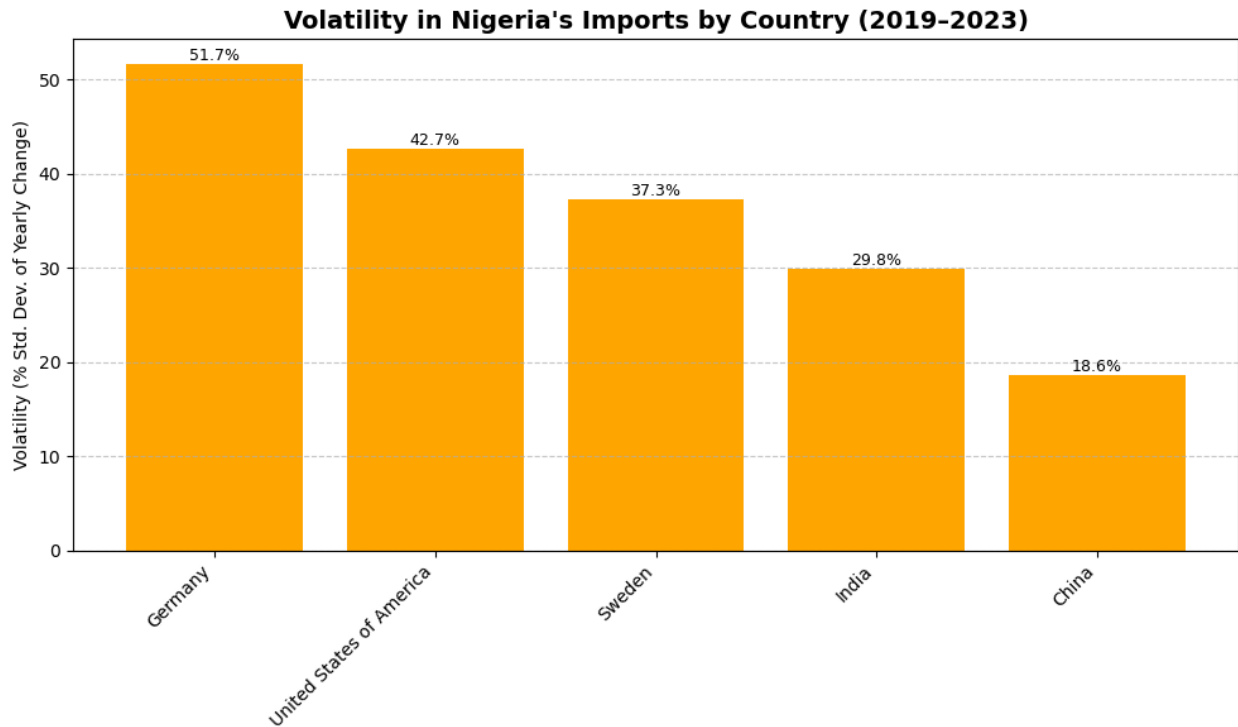
Volatility in Nigeria's Imports by Country (2019–2023)


```python
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

# Load the cleaned dataset
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Remove 'World' row
df = df[df["Exporters"] != "World"].copy()

# Define year columns
year_cols = ['2019', '2020', '2021', '2022', '2023']

# Function to calculate CAGR
def calculate_cagr(start, end, periods):
    if start > 0 and end > 0:
        return ((end / start) ** (1 / periods) - 1) * 100
    else:
        return np.nan

# Calculate CAGR for each exporter
df["CAGR (2019–2023, %)"] = df.apply(
    lambda row: calculate_cagr(row['2019'], row['2023'], 4), axis=1
)

# Sort by CAGR
df_sorted = df.sort_values(by="CAGR (2019–2023, %)", ascending=False)
```
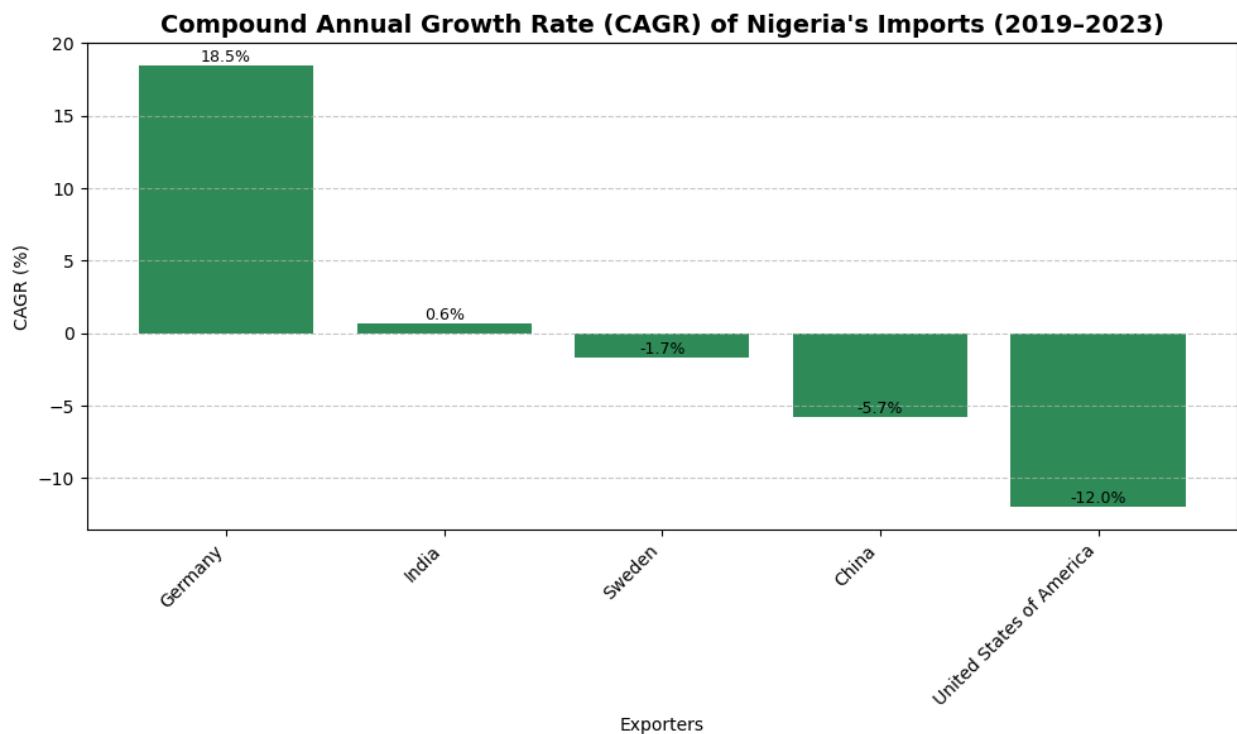
```python
# Plotting
plt.figure(figsize=(10, 6))
bars = plt.bar(df_sorted["Exporters"], df_sorted["CAGR (2019–2023,
%)"], color='seagreen')

# Add data labels
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, height, f'{height:.1f}
%', ha='center', va='bottom', fontsize=9)

plt.title("Compound Annual Growth Rate (CAGR) of Nigeria's Imports
(2019–2023)", fontsize=14, weight='bold')
plt.xlabel("Exporters")
plt.ylabel("CAGR (%)")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```



```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")
```

```python
# Separate total (World) and exporter data
total = df[df["Exporters"] == "World"].set_index("Exporters")
exporters_df = df[df["Exporters"] != "World"].copy()

# Calculate percentage share for each year
years = ['2019', '2020', '2021', '2022', '2023']
share_df = exporters_df.copy()
for year in years:
    world_total = total.at["World", year]
    share_df[year] = (share_df[year] / world_total * 100).round(2)

# Get top 5 contributors per year
top_contributors = set()
for year in years:
    top = share_df[["Exporters", year]].nlargest(5, year)
    top_contributors.update(top["Exporters"])

# Filter for top contributors
top_df =
share_df[share_df["Exporters"].isin(top_contributors)].set_index("Expo
rters")

# Transpose for stacked bar
plot_df = top_df[years].T

# Plot stacked bar
plt.figure(figsize=(10, 6))
plot_df.plot(kind='bar', stacked=True, colormap='tab20', figsize=(10,
6))

# Add labels on top of bars
for i, year in enumerate(years):
    total_val = 0
    for country in plot_df.columns:
        height = plot_df.loc[year, country]
        if height > 5:  # label only if significant
            plt.text(i, total_val + height / 2, f"{height:.1f}%",
ha='center', va='center', fontsize=8)
        total_val += height

plt.title("Top 5 Import Contributors to Nigeria by Year (% Share)",
fontsize=14, weight='bold')
plt.ylabel("Share of Total Imports (%)")
plt.xlabel("Year")
plt.xticks(rotation=0)
plt.legend(title="Exporters", bbox_to_anchor=(1.05, 1), loc='upper
left')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```
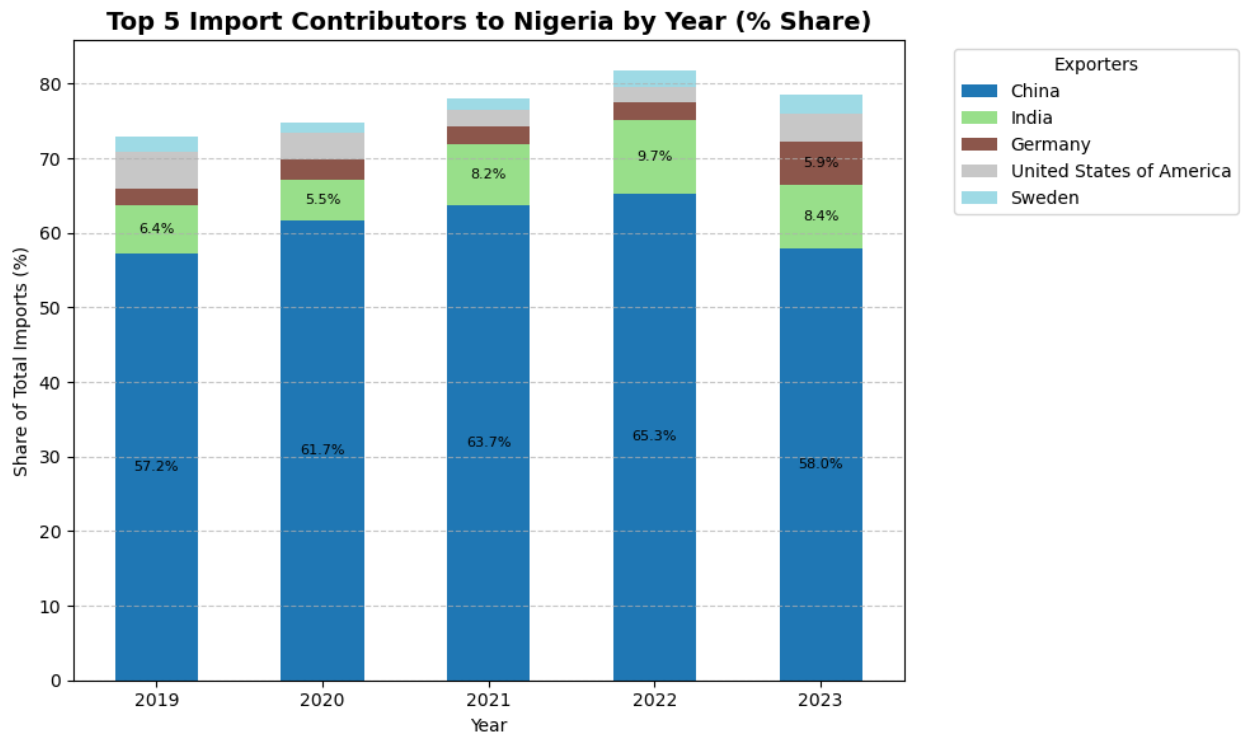
```
<Figure size 1000x600 with 0 Axes>
```



```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Separate 'World' and countries
world_total = df[df["Exporters"] == "World"].set_index("Exporters")
exporters_df = df[df["Exporters"] != "World"].copy()

# Define years
years = ['2019', '2020', '2021', '2022', '2023']

# Calculate HHI for each year
hhi_scores = []
for year in years:
    total = world_total.at["World", year]
    shares = (exporters_df[year] / total) * 100
    hhi = (shares ** 2).sum()
    hhi_scores.append(round(hhi, 2))

# Plot HHI trend
plt.figure(figsize=(8, 5))
plt.plot(years, hhi_scores, marker='o', linestyle='-',
color='crimson', linewidth=2)
```
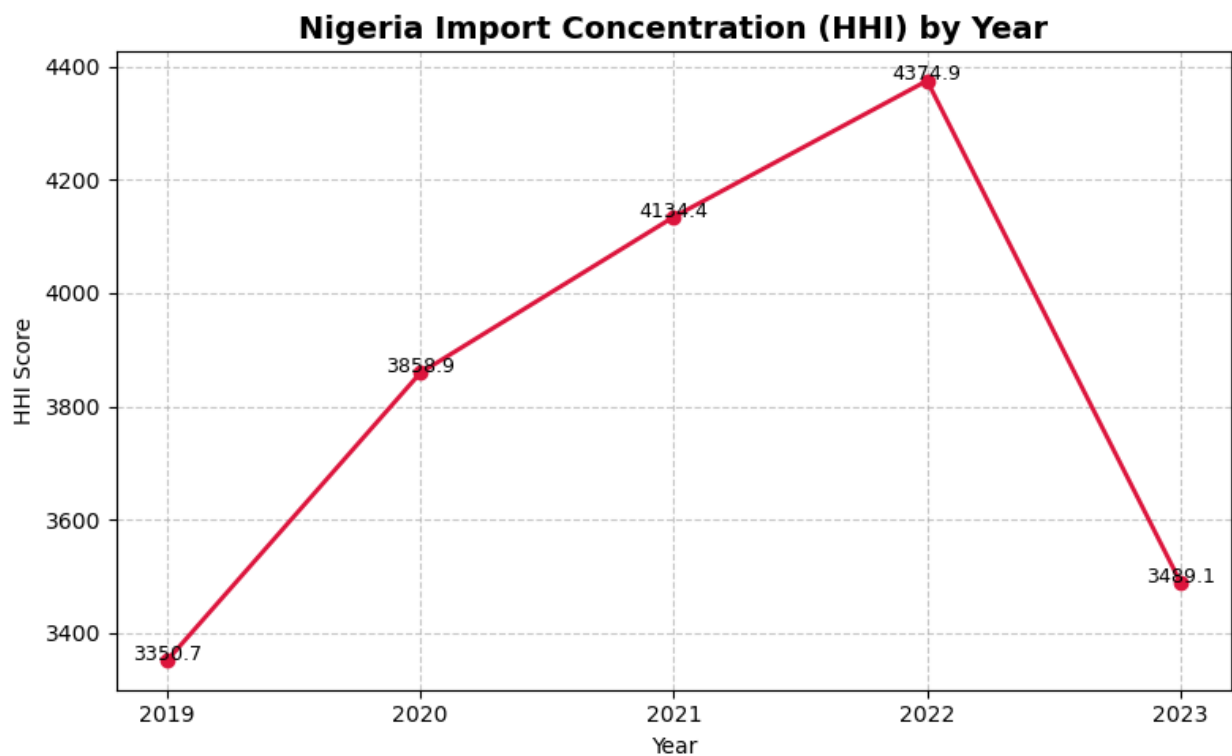
```
# Add data labels
for i, score in enumerate(hhi_scores):
    plt.text(years[i], score + 0.5, f"{score:.1f}", ha='center',
fontsize=9)

plt.title("Nigeria Import Concentration (HHI) by Year", fontsize=14,
weight='bold')
plt.xlabel("Year")
plt.ylabel("HHI Score")
plt.grid(True, linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```


Nigeria Import Concentration (HHI) by Year

```
import pandas as pd
import matplotlib.pyplot as plt

# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Filter exporters only
df = df[df["Exporters"] != "World"].copy()

# Calculate percent change from 2019 to 2020
df["COVID Impact (%)"] = ((df["2020"] - df["2019"]) / df["2019"]) *
100
```

```python
df["COVID Impact (%)"] = df["COVID Impact (%)"].round(1)

# Sort by impact (lowest to highest)
df_sorted = df.sort_values(by="COVID Impact (%)")

# Plot
plt.figure(figsize=(10, 6))
bars = plt.bar(df_sorted["Exporters"], df_sorted["COVID Impact (%)"],
color='steelblue')

# Add data labels
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, height, f'{height:.1f}
%', ha='center', va='bottom' if height >= 0 else 'top', fontsize=9)

plt.axhline(0, color='black', linewidth=0.8)
plt.title("Impact of COVID-19 on Nigeria's Imports by Country (2019–
2020)", fontsize=14, weight='bold')
plt.ylabel("Change in Import Value (%)")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```
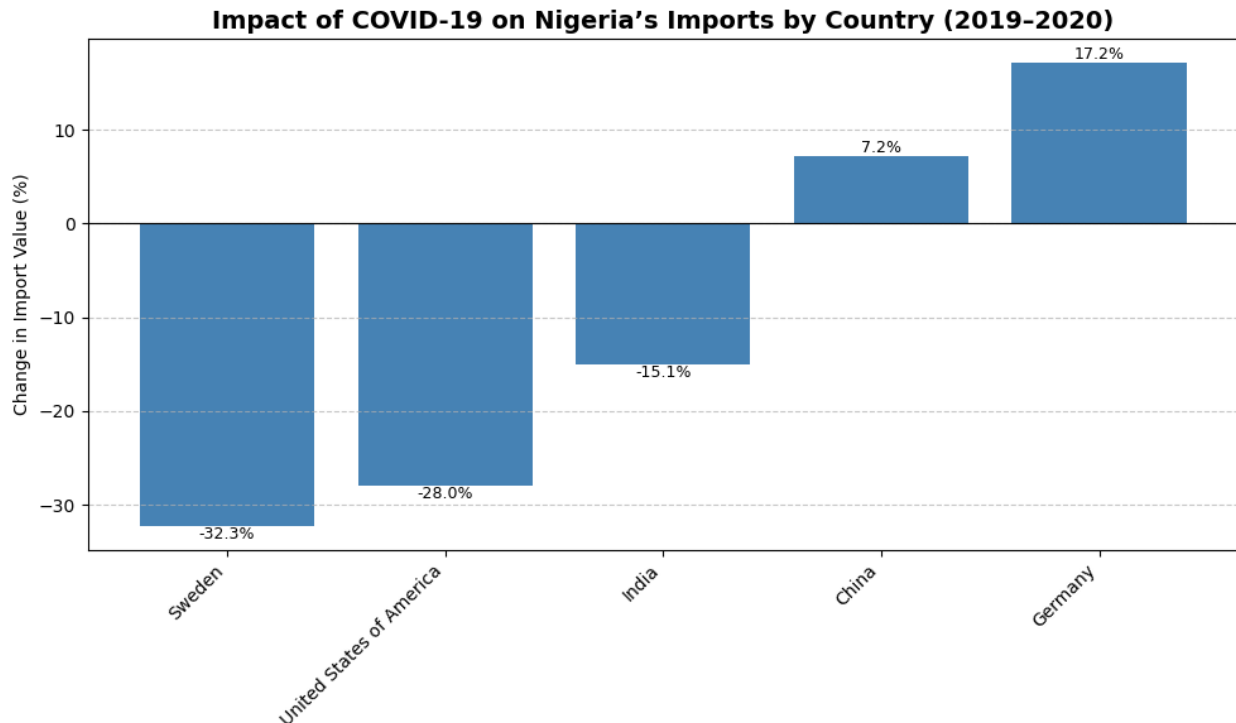


```python
import pandas as pd
import matplotlib.pyplot as plt
```

```python
# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Exclude World total
df = df[df["Exporters"] != "World"].copy()

# Filter countries with a declining trend over 2021, 2022, 2023
decliners = df[
    (df["2021"] > df["2022"]) &
    (df["2022"] > df["2023"])
].copy()

# Sort by total drop
decliners["Total Drop"] = decliners["2021"] - decliners["2023"]
decliners = decliners.sort_values(by="Total Drop", ascending=False)

# Plot
plt.figure(figsize=(10, 6))
bars = plt.bar(decliners["Exporters"], decliners["Total Drop"],
color='darkorange')

# Add data labels
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, height,
f'{height:,.0f}', ha='center', va='bottom', fontsize=9)

plt.title("Countries with Consistent Import Decline to Nigeria (2021–
2023)", fontsize=14, weight='bold')
plt.ylabel("Total Drop in Import Value (USD)")
plt.xlabel("Exporters")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```
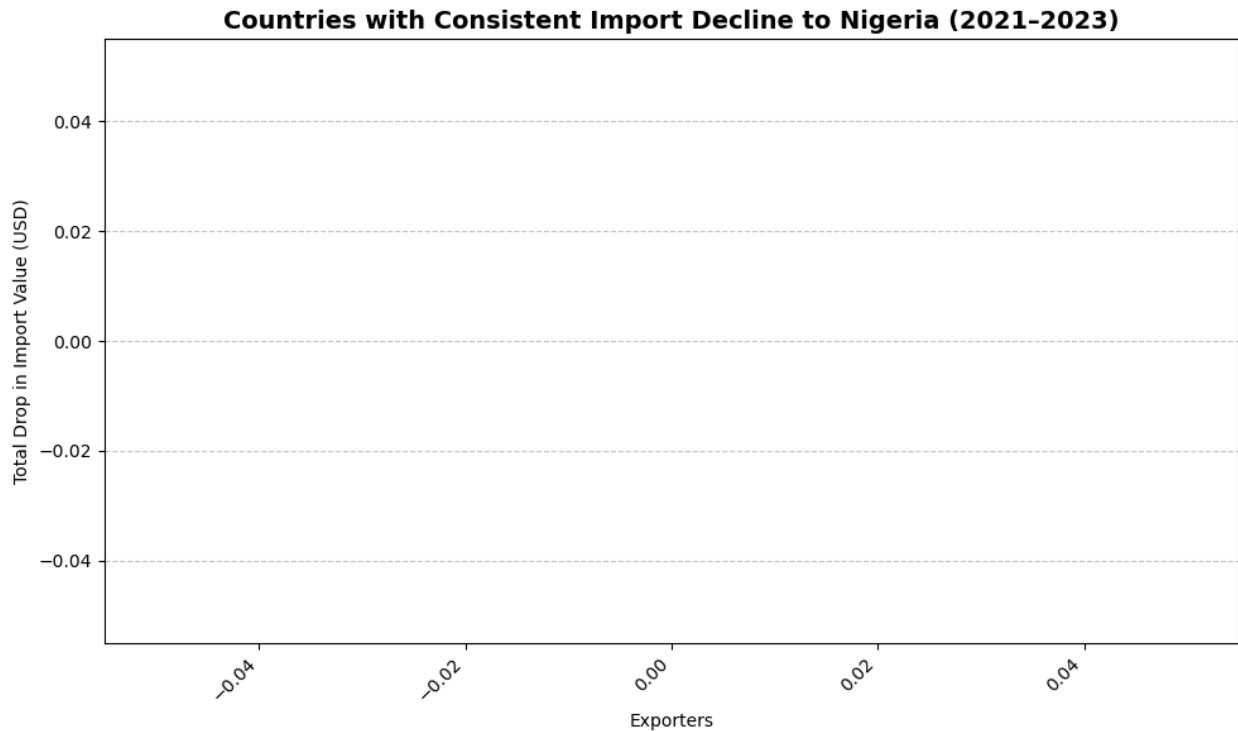
Countries with Consistent Import Decline to Nigeria (2021-2023)


```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the cleaned data
df = pd.read_csv("nigeria_imports_cleaned.csv")

# Exclude 'World' total
df = df[df["Exporters"] != "World"].copy()

# Filter for consistent growth over 2021-2023
growers = df[
    (df["2019"] < df["2022"]) &
    (df["2019"] < df["2023"])
].copy()

# Calculate total growth
growers["Total Growth"] = growers["2023"] - growers["2021"]
growers = growers.sort_values(by="Total Growth", ascending=False)

# Plot
plt.figure(figsize=(10, 6))
bars = plt.bar(growers["Exporters"], growers["Total Growth"],
color='seagreen')

# Add data labels
for bar in bars:
    height = bar.get_height()
```

```
    plt.text(bar.get_x() + bar.get_width()/2, height,
f'{height:,.0f}', ha='center', va='bottom', fontsize=9)

plt.title("Countries with Consistent Import Growth to Nigeria (2021–
2023)", fontsize=14, weight='bold')
plt.ylabel("Total Growth in Import Value (USD)")
plt.xlabel("Exporters")
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```


Countries with Consistent Import Growth to Nigeria (2021–2023)