61_France

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1 How have arms imports evolved relative to arms exports in France between 1960 and 2024?

1.1 Abstract

Using World Bank World Development Indicators (WDI), which incorporate SIPRI trend indicator values, this study examines how arms imports have evolved relative to arms exports in France between 1960 and 2024. These indicators provide insight into France's defense trade balance, military-industrial activity, and global strategic positioning. Over the period, both arms imports and exports were highly volatile, reflecting changing geopolitical contexts, regional conflicts, and evolving defense policies. Despite this volatility, exports consistently exceeded imports, often by a substantial margin, highlighting France's role as a major global arms supplier. The year-to-year fluctuations in both indicators underscore the influence of international demand, domestic production capacity, and strategic policy decisions on defense trade flows. Together, these trends illuminate France's sustained prominence in global arms markets and the dynamic nature of its defense trade over more than six decades.

1.2 1. Question

How have arms imports evolved relative to arms exports in France between 1960 and 2024?

- **Arms imports proxy**: Arms imports (SIPRI trend indicator values, WDI)
- **Arms exports proxy**: Arms exports (SIPRI trend indicator values, WDI)

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
  - Arms imports (trend indicator values)
  - Arms exports (trend indicator values)
- **Coverage**: France, 1960–2024
- **Notes**: National-level data only

1.4 3. Method

1. Filtered the WDI dataset for France and selected arms import and export indicators.
2. **Extracted relevant columns**: Year, Indicator Name, and Value.
3. Pivoted the dataset to create a chronological comparison of imports versus exports.
4. Produced a dual-line time series plot to visualize magnitude, volatility, and relative balance between arms imports and exports.

(Analysis is descriptive; no causal inference applied.)

1.5 4. Results

- **Arms imports**: Highly volatile throughout the period, reflecting fluctuations in procurement needs, defense budgets, and international sourcing.
- **Arms exports**: Also volatile but consistently exceeded imports, often by a substantial margin, highlighting France's position as a net arms exporter.
- **Comparison**: Despite year-to-year fluctuations, export dominance was persistent, emphasizing France's sustained production and sale of military equipment globally.

(Figure 1. France: Arms Imports vs. Arms Exports, 1960–2024)

(Table 1. Pivoted dataset summary)

1.6 5. Interpretation

- The persistent export dominance reflects France's strong military-industrial base and strategic focus on defense exports.
- Volatility in imports and exports corresponds to geopolitical events, regional conflicts, shifts in alliances, and changes in defense policy or procurement cycles.
- France's role as a leading global arms supplier is clear, although fluctuations demonstrate sensitivity to international demand, sanctions, and global security dynamics.
- These patterns highlight the balance between domestic defense needs and external market engagement, offering a lens to understand France's defense economy and global influence.

1.7 6. Limitations

- SIPRI values within WDI are estimates and may not capture classified or unreported transactions.
- National-level data mask regional production differences or industry-specific export trends.
- Descriptive analysis does not isolate causal factors such as foreign policy shifts, military interventions, or industrial policy changes.

1.8 7. Next Steps / Extensions

- Examine specific periods of high volatility to identify underlying geopolitical or policy drivers.
- Disaggregate exports and imports by equipment type (aircraft, naval, land systems) to understand composition trends.
- Compare France's arms trade trajectory with other major exporters to contextualize its global standing.
- Explore correlations between arms export dominance and defense R&D investment, domestic production capacity, and international security commitments.

[1]:
```
# How have arms imports evolved relative to arms exports in France between 1960␣
↪and 2024?

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

```
# Folders
data_raw_folder = "data_raw/"
data_clean_folder = "data_clean/"
figures_folder = "figures/"

# Load CSV
filename = "trade_fra_filtered.csv"  # Filtered dataset with only relevant rows
df = pd.read_csv(os.path.join(data_raw_folder, filename))

# Keep only needed columns
df = df[["Year", "Indicator Name", "Value"]]

# Convert Year and Value to numeric, drop invalid rows
df["Year"] = pd.to_numeric(df["Year"], errors="coerce")
df["Value"] = pd.to_numeric(df["Value"], errors="coerce")
df = df.dropna(subset=["Year", "Value"])

# Pivot indicators into separate columns
df_pivot = df.pivot(index="Year", columns="Indicator Name", values="Value").
 ↪reset_index()
df_pivot = df_pivot.sort_values("Year")

print("Pivoted France dataset:")
display(df_pivot)

# Interpolate missing values for smooth plotting (optional)
df_plot = df_pivot.interpolate(method='linear')

# Plot the indicators
plt.figure(figsize=(10,6))
plt.plot(df_plot["Year"], df_plot["Arms imports (SIPRI trend indicator␣
 ↪values)"],
         marker='o', linestyle='-', label="Arms imports")
plt.plot(df_plot["Year"], df_plot["Arms exports (SIPRI trend indicator␣
 ↪values)"],
         marker='o', linestyle='-', label="Arms exports")

plt.title("France: Arms imports vs Exports (SIPRI trend indicator values)␣
 ↪(1960-2024)")
plt.xlabel("Year")
plt.ylabel("Number (SIPRI trend indicator values)")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder, "france_arms_imports_vs_exports.png"))
plt.show()
```

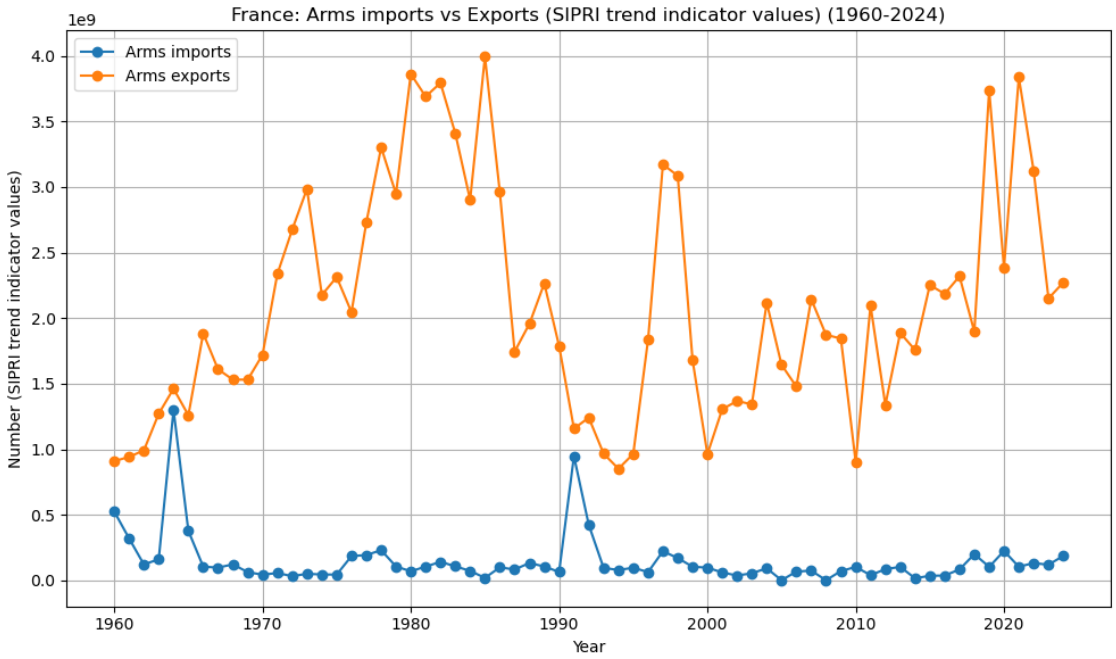
```
# Save cleaned CSV
df_pivot.to_csv(os.path.join(data_clean_folder,␣
 ↪"france_arms_imports_vs_exports"), index=False)
```

Pivoted France dataset:

```
Indicator Name  Year  Arms exports (SIPRI trend indicator values)  \
0               1960                                   910000000
1               1961                                   942000000
2               1962                                   992000000
3               1963                                  1271000000
4               1964                                  1462000000
..               …                                           …
60              2020                                  2384000000
61              2021                                  3836000000
62              2022                                  3123000000
63              2023                                  2150000000
64              2024                                  2272000000

Indicator Name  Arms imports (SIPRI trend indicator values)
0                                                 526000000
1                                                 321000000
2                                                 122000000
3                                                 162000000
4                                                1300000000
..                                                      …
60                                                225000000
61                                                105000000
62                                                133000000
63                                                120000000
64                                                188000000

[65 rows x 3 columns]
```


France: Arms imports vs Exports (SIPRI trend indicator values) (1960-2024)
1e9
Arms imports
Arms exports
Number (SIPRI trend indicator values)
Year
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1960
1970
1980
1990
2000
2010
2020

[ ]: