ARMED STRENGTH: ANALYZING NATIONAL CAPABILITIES AND CONFLICT FREQUENCY IN ASIA

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Introduction & Motivation

Motivation: leverage data science to uncover how national material capabilities shape historical trends in conflict and global power dynamics.

Our research question:

- How do changes in national material capabilities influence the frequency of a country's conflicts, particularly in Asia?

Hypothesis:
- We hypothesize that countries with higher military expenditures and and iron and steel production are more likely to participate in armed conflicts.

The Data

- Datasets from Correlates of War (COW) project
  - National Material Capabilities
  - Militarized Interstate Disputes, 1816–2014

- Each observation from the joined dataset represents a country's national material capabilities and militarized interstate disputes in a certain year

- Variables include military expenditures, personnel, iron production, conflict start and end dates, and casualties.

- Mutated the data → included the variables:
  - "count": total incident count for a given country in a given year
  - "milex_class": classifying the military expenditure as being either above or below the median military expenditure
  - "irst_class": classifying the iron and steel production as being either above or below the median iron and steel Production

Narrowed focus on Asia

Total Conflict Incidents by Continent
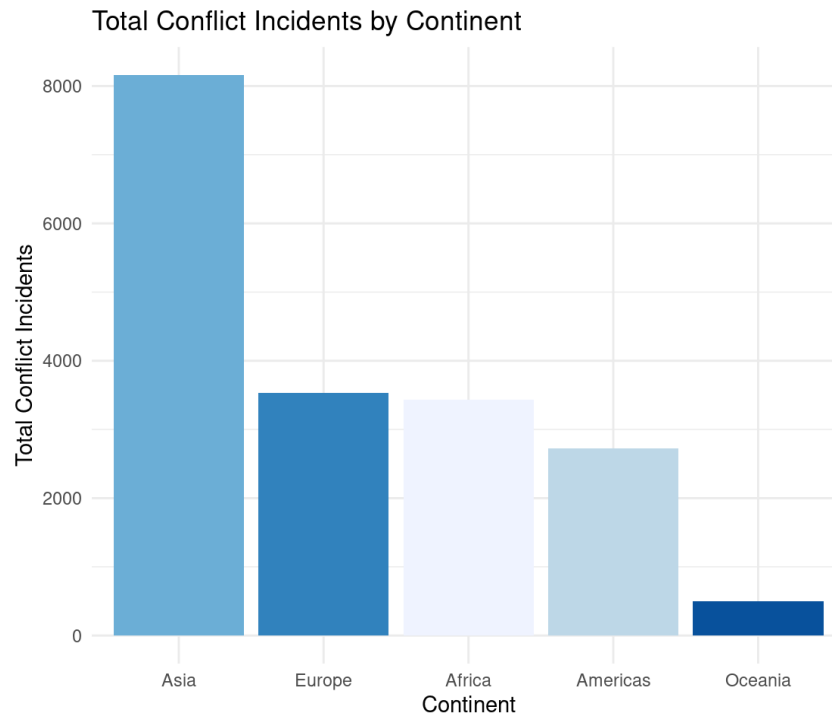
Exploring the Data: Correlations and Patterns

Table 2: Demonstrating Correlation between Total Incident Counts and Material Capabilities

Military Capability	Correlation To Incident Count
Military Expenditures (thousands)	0.2106707
Military Personnel (thousands)	0.1056496
Iron and Steel Production (thousands of tons)	0.1633682

Insights: Military expenditures and iron production show the strongest correlation with conflict frequency

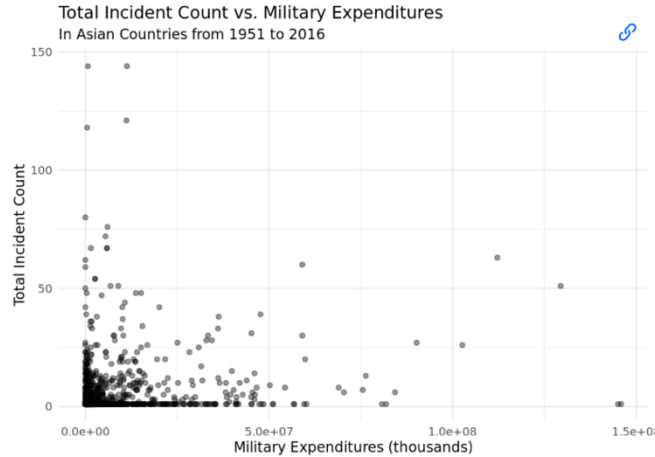# **Exploring the Data:** Military Capabilities and Conflict

Figure 2: Total Incident Count vs. Military Expenditures

Figure 3: Total Incident Count vs. Iron and Steel Production

Insights: While higher material capabilities may correspond to increased conflict involvement for some countries, the overall patterns suggest weak linear correlations.

Exploring the Data: Military Expenditures and Iron Production

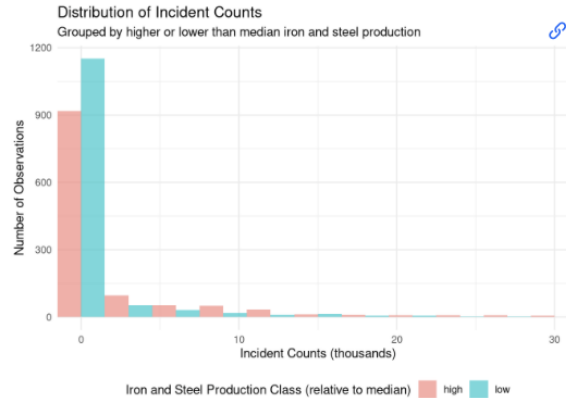Figure 4: Distribution of conflicts for countries with different military spending levels.

Figure 5: Distribution of conflicts for countries with different industrial power/production

Insights: Countries with military expenditures or industrial production above the median show slightly higher conflict involvement

Testing the Data: Bootstrapping

Results

Bootstrap Test for Military expenditure and Conflict Frequency

(avg high milex) incident count median	(avg low milex) incident count median
1	1

Bootstrap Test for Iron Production and Conflict Frequency

(avg high irst) incident count median	(avg low irst) incident count median
1	1

Insights: No statistically significant correlation between military expenditures, iron and steel production, and conflict. The differences in medians even following bootstrapping is essentially 0.

Testing the Data: Hypothesis Evaluation

Hypothesis Test

	p-value of milex
	0.998

Lower Bound for milex	Upper Bound for milex
–0.695122	0.6444532

	p-value of irst
	0.958

Lower Bound for irst	Upper Bound for irst
–0.6642796	0.6492647

Insights: Our p-values were both extremely high, therefore we fail to reject the null – suggests there is no correlation between both military capabilities and conflict frequency

Conclusion & Limitations & Future Work

Findings:
Weak positive linear relationships observed but not statistically significant.
Data is heavily right-skewed; median incident counts remain low for most countries.

Limitations:
Lack of knowledge about different tests

Future Directions:
Expand analysis beyond Asia to include other continents.
Explore additional variables (e.g., GDP, population) or conflict severity metrics.
Apply advanced models better suited for skewed or categorical data.