Problem Statement

- From the open literature, the DoD does not have any models that address pecuniary warfare.
- Historical macroeconomic models do not sufficiently capture the complex and dynamic nature of pecuniary warfare tactics.
- Dynamic systems modeling has been used to model other complex systems in nature.

Objective

To build a foundation for analysis to begin addressing the impacts of pecuniary warfare.

1. Conjectured Single Country Model

- Defined the internal factors of an economy and the external factors that affect the economy.
- Established relationships between the factors using prior research.

2. Data Collection & Processing

- Monthly data to capture the short to medium term impacts.
- Ranges from May 2006 to December 2013 (90 months).

3. Create the Functional Form of the System

4. Solve for $\alpha$, $\beta$, and $\delta$ Coefficients

5. Prediction Analysis

- 6 month and 1.5 year predictions were calculated using Euler Method and the derivatives defined by the dynamic system.
- The dynamic systems modeling predicted the factors state in the short term extremely well.

6. What-If Analysis

- Gradual Decrease Scenario: What if the Federal Reserve didn’t drop the FFR to historic lows after the 2008 crisis?
- No Change Scenario: What if the Federal Reserve maintained the FFR at the past year’s average?
- What-If Analysis showed that changes to the FFR policy had statistically significant impacts on the GDP per capita and BY indices of a country at the $\alpha = .05$ level, but not the SM index.

Findings

- Repeatability methodology that uses open source data and common software.
- Captures the interactions of an economy’s factors and the influence of external factors.
- Demonstrates the capability to conduct near term forecasts and what-if analysis.
- Developing models of pecuniary warfare may help to inform decision makers on the impacts of future policy.

Impact

- Fills a gap, the first methodology to address pecuniary warfare.
- Gives an analyst the ability to “turn the dial” on the economic instrument of national power.

Future Research

- Enhance data collection to find the “best” data set.
- Incorporate additional factors, both internal and external, like trade or a debt limit.
- Account for other country’s economic instruments of national power.
- Application of the model to inform the cost, payoff, or behavioral functions in mean field game theory.