"Smart Sanctions - Smarter Targets:" Developing a “Learning Network” Model

Research Question

Iranian government, financial, and business entities are adapting to, and learning from, each new round of international sanctions. As a sanction is imposed, agents and organizations, predictably, develop creative methods to bypass it in order to continue the pursuit of nuclear weapons production. Based on this scenario, can we quantitatively model the evolution and “learning” of this Iranian Network?

Background

Iran is still pursuing a nuclear weapons program despite successive UN economic sanctions imposed since 2006, and recent sanctions imposed by the US and EU. According to a November 2011 International Atomic Energy Agency Report, "United Nations weapons inspectors have amassed a trove of new evidence that they say makes a credible case that Iran has carried out activities relevant to the development of a nuclear device, and the project may still be under way." A growing body of research conducted over the past ten years suggests that sanctions, even "smart sanctions," simply cause targeted regimes to entrench themselves while continuing to pursue their political goals including proliferation and political repression. As the use of sanctions becomes even smarter, perhaps the targets of the sanctions themselves are adapting and learning, and simply bypassing each new round of sanctions.

Methodology

Use network analysis to model how Iranian entities involved in nuclear weapons production are adapting to and learning from the application of international sanctions. Network Analysis techniques are flexible enough that numerous types of networks can be analyzed, including: social networks, organizational networks, physical networks, financial networks, beliefs, roles, or action networks.

This ability to classify individual nodes in a network enables “decision makers” to quickly “zero in” and focus on the prominent and influential nodes in any developed network. This technique is amazingly powerful and applicable not only to the analysis of traditional social networks but to organizational networks, functional meta-networks, and roles or beliefs.

By conducting an analysis of the networks of the suspected Iranian financial, business, and associated government entities directly or indirectly involved in the production of nuclear weapons over time, many of which are trading on the Tehran Stock Exchange
while subject to international sanctions, we believe we will be able to determine how the networks has adapted or learned over time to bypass sanctions while continuing to pursue the direct or indirect support of nuclear weapons production.

A “Learning Network”

The team conducted a limited-scale, open-source data draw to facilitate a “proof of concept study.” This data draw included 56 prominent agents operating in the Iranian economy.

56 Key Agents-Iran Economy

The team developed an affiliation network determining how agents are connected through organizations and how organizations are connected through agents. This initial
analysis yielded key insights such as the influence of many “charitable-based trusts” and the Revolutionary Guard. These findings are backed by a rigorous quantitative methodology and can be obtained without any prior knowledge of the Iranian economy or political landscape.

**Agent Network-Degree Centrality**

Nodes with high centrality tend to be “in the know.”

**Organizational Network-Degree Centrality**

Nodes with high centrality tend to be “in the know.”
Conclusion

The team will build upon this methodology and develop a longitudinal data set based on the dates that sanctions were imposed. This information will allow us to analyze the evolution of the network based on the external perturbations and mathematically model “learning” in a network.

Investigation Team Bios:

Colonel Graham, PhD will serve as Co-Principal Investigator. He is currently West Point’s Associate Dean for Research and Chief Scientist, as well as the Director of the Network Science Center. He received a PhD from Carnegie Mellon University, a M.S. from Ohio State University. Previously, COL Graham served as Program Manager for Engineering Psychology and General Psychology, and the Laboratory Director in the Behavioral Sciences and Leadership Department at West Point. Contact Info: john.graham@usma.edu

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Mr. Robert Rasmussen will serve as a research associate. He is an associated researcher with the Network Science Center, West Point and a graduate student at the Maxwell School at Syracuse University.