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Final Report

Introduction:

This summer I have been working on an Army Deep Futures Model project named Themis. Themis is a JPL based modeling framework that anticipates possible future states for the world within the next 25 years. The goal of this framework is to determine the likelihood that the US Army will need to intervene on behalf of the US strategic interests. Key elements that are modeled within this tool include the world structure and major decisions that are made by key actors. Each actor makes decisions based on their goals and within the constraints of the structure of the system in which they are located. In my research I have focused primarily on the effects of structures upon the decision-making processes of the actors within them. This research is a natural extension of my major program at Georgetown University, where I am studying the International Political Economy and the structures that make it up. My basic goal for this summer project was to be a helpful asset to the Themis modeling team, with any research done or processes learned constituting a bonus.

Background:

I undertook this research project so that I might learn more about how to construct models, have an opportunity to study the political structure of the United States, and examine the relationship between the economy and the political process. I had taken classes

examining both the formation of the United States as a political entity, and on the history of its economic development. I also took a seminar course that focused on the historical effects of policy on the economic development of industries and countries. These experiences informed my research in that I already had a clear idea coming into the summer of what I wanted to research, and more importantly, which interactions I wanted to focus on. If my project is successful, it will help the developers of Themis in creating a model that accurately analyzes actor decision-making based on the structure of the system in which the actors are found. My work seeks to show the relationships between the institutions and branches of government across countries using few variables, and to be able to be dynamic in adjusting for different types of governments, such as theocracy or democracy.

Objectives:

The goal of this research effort is to explain the function and interaction of specific actors within varied political systems. This project aimed to build a descriptive model that could be applied to all the governments of the world that would allow for differences in history of countries, political processes, and binding arrangements with other nations. My personal goal for this summer was to aid the Themis modeling team in constructing an accurate political model, although I did also want to broaden my own knowledge of modeling.

Approach:

When I began this project I had no idea how to describe the research and compilation work that I was doing, and it was only after several different approaches that I managed to

definitively define what my project was. This process can be described top-down research. At first, I read all the case studies available about deep futures modeling, technological advances, science fiction author predictions, and even blogs about what the world might look like ten or twenty years from now. This high-level research helped me narrow down what I wanted to study more closely, and the goal changed to describing the government of the United States in such a way that the model could be applied to other countries as well.

The first step in modeling the structure of a country system was to identify the key actors within it. Once this has been accomplished, their places within the structure must be established, especially their powers and the influences on them. After this, those actors' interactions with each other within the confines of the system becomes important, and finally, the actual ways in which the actors may influence the structure of their system. This process will show not only who key actors and influence groups are within a system, but how the structure of that system effects their behavior, and the power that they have to in turn influence that system back. This is important because it can help identify problem regions, where individuals may have too much influence on the structure of their system, or where the interest groups such as voting citizens have effectively no influence at all.

In defining the broad structure of the government, the best approach seemed to be one irrespective of transient actors. I used the United States as a case study, and tested the applicability of the Gravity Model of Trade on the amount of interaction between branches of government and other actors in the system. The Gravity Model of Trade analyzes the amount of bilateral trade between countries based primarily on their proximity to each other and the size of their respective GDPs. In adapting this model to the political spectrum, I adjusted this to mean the amount of influence an actor has on a policy issue (GDP) and this actor's ability

to effectively use that influence (proximity). I was unable to quantify the values of the relations of different parts of the American system, but I believe that it can be done, and is specific to the situation being modeled. The abstraction of the Gravity Model to determine key actors within a system, especially when used in specific situations, worked effectively. However, the specific application of this model to individual situations may prove too cumbersome for use in Themis, as weights for actors within the system would need to be recalibrated each time.

Another aspect of this research, however, involves the distinctions between types of governments, and a way to model those differences at an abstract, high level. Government textbooks, transcripts of my notes from classes at Georgetown, world news articles, and analyses related to the subject, as well as satirical comparisons that deride the religious establishment's influence in the United States, all helped define a set of governmental structures. These works led me to believe that there are four basic types of government, Democracy, Secular Dictatorship, Constitutional Monarchies, and Theocracies. For example, a Democracy has no hereditary dynasties, and elects all leaders that legislate, while a Constitutional Monarchy has unelected leaders. Also, a Secular Dictatorship usually follows a cult of personality for an individual or family, whereas a Theocracy uses the structure of religion to transition between leaders. I believe that the fundamental differences between governments are in the way they transfer power. These distinctions between types of government are important to Themis, as they will provide an easier way to classify countries within the model. I have also looked into having the type of government inform an aspect of a country's stability rating, which would help in Themis' goal of informing the US Army of possible areas of future volatility.

Results:

This research project focused on a detailed analysis of the important interface between actors and the system in which they are situated. Using the United States as the primary case study I developed a basic political adaptation of the gravity model of trade, categorized all the governments of the world into four simple categories, and produced numerous compilations of data relevant to United States actor motivations, powers, and interactions. Some research that I worked on in addition to my central project also looked into the overall structure of world government, and of the various regional political and economic blocks that operate within that structure. At the start of this project, I had no clear goals other than helping the Themis team develop a succinct political model, and so there were no expectations with which to compare the outcome. Nevertheless, I feel that my contributions have been a helpful asset to the Themis modeling team.

Conclusions:

During my research on this project I expanded my knowledge base into the realm of modeling and structure analysis, learning much about the variables that go into political models and constraints upon their accuracy. In my individual research I learned about how various government and international entities take surveys and record data, and about world resource usage and distribution. I also explored the relationships between trade and political cooperation, and between financial independence and sovereignty, which aided in the production of a succinct political model.

I think that the gravity model of trade, along with a volatility index according to regime type across countries, could be important variables in any Themis model. Also, the careful analysis of any large system is integral to understanding the behaviors and actions of the actors within it. I learned several new approaches to organizing information during this project, and improved my capabilities with Microsoft PowerPoint and Excel as well.

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