USC CREATE
HOMELAND SECURITY CENTER

Advancing Computable General Equilibrium Analyses of the Economic Consequences of Terrorism
Peter Dixon, Centre of Policy Studies (CoPS) at Monash University, Australia

This project will establish a working relationship between CREATE and the Centre of Policy Studies (CoPS) at Monash University, Australia, to enhance the ability of both organizations to analyze the economic consequences of terrorism.

Other Investigators: Adam Rose (CREATE); James Giesecke (CoPS)

Brief Description:
CREATE has evaluated several modeling approaches to estimating the national and regional consequences of terrorist attacks. This past year, we utilized the leading regional/national econometric package, REMI, to analyze the economic impacts of a shutdown of the US borders to trade, travel, and tourism in the face of a public health threat or terrorist attack. Unfortunately, we found REMI to have significant shortcomings for cases of major shocks to the economy that involve issues of interregional and international competition. Progress has been made by CREATE researchers in improving input-output models in the areas of interregional interactions (NIEMO) and some incorporation of resilience considerations (primarily Flex-NIEMO). However, I-O remains limited in many applications due to its inherent linearity, lack of behavioral content, and inability to represent the detailed workings of markets. On the other hand, computable general equilibrium (CGE) modeling has been successfully applied to a number of terrorist scenarios and has the capability to be applied successfully to a broader range of applications than any of the alternatives.

Peter Dixon at the Centre of Policy Studies (CoPS) at Monash University, Australia, has pioneered many advances in CGE modeling (Dixon et al., 1992). More recently, he has performed studies for the U.S. Department of Commerce and for DHS (Dixon et al., 2008). The latest generation of his CGE models has dynamic elements and can be run on a quarterly rather than annual basis. Moreover, a top-down algorithm has been developed to allocate the national results to various regions (Dixon et al., 2007). At the same time, CREATE has pioneered the inclusion of resilience into CGE models (Rose and Liao, 2005) and has successfully constructed and applied bottom-up regional models to terrorist attacks (Rose et al., 2007). However, the CREATE CGE models are annual and static. Much can be accomplished by a collaboration between CREATE and CoPS. This will be accomplished by interactive research at each site and through the visitation by Peter Dixon to CREATE during the winter of 2008 and by on of his staff associates, James Giesecke, during 2008-09, as well as by a visit to Monash University by Adam Rose in 2009-10.

Objectives:
1. Collaboration to enhance CEG modeling capability at both institutions.
2. Transformation of the CREATE static CEG model to a dynamic model by transferring CoPS technology to CREATE.
3. Assistance to CoPS in the development of a regional CGE modeling capability by transferring technology from CREATE.
4. Application of CGE models to various case studies, including a shutdown of the US border and attacks on various regions of the US.

Interfaces to other Center Projects:
This research will advance a major macroeconomic modeling approach to the state of the art level. This capability will be useful to other CREATE researchers in joint projects, as well as those at other DHS centers.

Interfaces to non-Center Projects:
This research will extend DHS center cooperation to a leading research center of a major U.S. ally in the fight against terrorism.

Major Products and Customers:
Project deliverables will consist of peer-reviewed papers, completion of important case studies, and more accurate estimates of economic consequences on the extent of the terrorist threat and can serve as the basis for evaluating the benefits of preventative action.

Technical Approach: The methodology builds on the work of the Peter Dixon and Adam Rose in the area of CGE modeling. It entails making principles of both micro and macro economics operational in a comprehensive model. The approach is based on the behavior of individual producers and consumers interacting through multiple markets. Special attention in this phase will be on investment and growth in making the models dynamic and on spatial interactions and competitiveness in regionalizing the models.

Major Milestones and Dates:
1. Scoping of needs to make CREATE CGE models dynamic--November 2008
2. Scoping of needs to build additional regional models --December 2008
3. Visit to CREATE by Peter Dixon--December 2008
4. Transformation of CREATE U.S. CGE model to dynamic form--January 2009
5. Construction of Regional CGE Model--May 2009
6. Application of U.S. Model--June 2009
7. Application of regional CGE models—September 2009

References:
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