An Input-Output Framework for Assessing Disaster Impacts on Nashville Metropolitan Region

Topic: Input-Output analysis of disasters 1
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The immense physical, economic, and social consequences caused by recent disasters have prompted national and local agencies to develop policies for preparedness and recovery. Disasters can damage physical infrastructure systems, disrupt the flow of traffic, and can cause substantial economic losses. In addition to the disruptions to infrastructure systems, such disasters can trigger a variety of economic effects including the inability of many employees to commute to work, as well as the disruptions to shipments of commodities. Workforce absence translates to production losses. Delayed commodity shipments also adversely impact productivity because local businesses are unable to operate at full capacity without the necessary resources. In light of these motivations, this paper develops an input-output model extension to explicitly identify regional perturbations pursuant to disaster scenarios. Historical data pertaining to the impacts of disasters on various economic sectors will be utilized as input scenarios to a dynamic input-output model. The resulting model is specifically implemented for the Nashville region, which is a major metropolitan area in the United States known for its vibrant music industry, and tourism, in general. The region is regularly visited by natural disasters like tornadoes and floods. The model developed in this paper is capable of estimating the distribution of losses across economic sectors in Nashville and provides a visualization capability to identify the critical sectors. Results of the study will help identify the critical sectors and can ultimately provide insights to formulating preparedness decisions to expedite disaster recovery.