



State of the Art of Demand Surge Modeling

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Among other phenomena, many insurance loss models estimate the increased losses in large-scale disasters—referred to here as catastrophes—compared to the losses in small-scale disasters. This amplification of loss has been traditionally and loosely called "demand surge," although there is a clear need for more specific terminology. Many factors have been identified as drivers of demand surge. First among them is the sudden and temporary increased demand for construction materials and labor that overwhelms local supplies. The purpose of the present research is to describe in qualitative terms the current understanding of demand surge in the broad sense of amplification of insured loss. Aspects of demand surge were observed following the 1886 Charleston, South Carolina, and 1906 San Francisco, U.S. earthquakes. More recently, the aftermaths of Cyclone Tracy, Hurricane Andrew, the Northridge Earthquake, the 1999 windstorms in France, the 2004-5 hurricane seasons on the Gulf Coast, and the 2007 floods in the U.K. all evidenced demand surge in one form or another. Each event highlights particular aspects of the broader demand-surge phenomena. In other words, there are general themes associated with demand surge, which have greater or lesser expression in each historic event. Pieces of the broader demand-surge phenomena have been described by mathematical models, with varying degrees of complexity. For example, researchers have used linear input-output or nonlinear computable general equilibrium models to describe the response of construction costs to a catastrophe. Ultimately the present research will include the gathering of evidence through interviews, field observations, reviews of academic and insurance industry literature, and data collection. This evidence will then inform and validate a general quantitative, mathematical model of the demand-surge process.