Estimating the State-by-State Economic Impacts of Hurricane Katrina

Aug. 19, 2005

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Motivations

- Extreme natural events that strike major population centers are relatively few. What can we learn from Katrina and its aftermath?
- It is important to extract lessons to help mitigate future losses from similar events.
- It is useful to examine detailed spatial economic effects from both demand- and supply-sides perspectives.
Objectives

- Understand the state-by-state economic impacts of New Orleans Customs District port(s) interruptions from Hurricane Katrina. State-level impacts are critical to federal-level political deliberations over the allocation of scarce DHS resources. We plan to estimate the state-by-state impacts of tourist industry and oil and gas refinery losses as soon as the data become available.
Objectives (continued)

- Develop and test a new elaborated NIEMO model that is the first to estimate interstate supply-side interactions as well as interstate demand-side interactions.
Figure 1.
NIEMO Modeling and Development process
NIEMO Development (continued)

- Created 51 Interindustry Input-Output Tables from 509 IMPLAN sectors, aggregated to 47 USC sectors and 51x51 trade tables.
- Inverted matrix of six million cells ((52x47) x (52x47)).
- A supply-side capability that builds on the work of Ghosh was added.
Short-term and downward impacts are the most plausible uses of the Ghoshian IO approach.

Direct losses of exports for calculation of the demand losses and of imports for calculation of value added were developed.

We are now estimating trade flows for service sectors, which will improve the current versions of the two NIEMOs.
Previous Applications

- Demand-side NIEMO has been applied to simulations of various terrorist attacks.

- Results for hypothetical one-month interruptions at major U.S. ports (Los Angeles-Long Beach, New York-Newark and Houston ports) were presented last year.
Previous Applications (continued)

- Total Impacts
  - LA/LB: $22.8 billions
  - NY/NW: $16.2 billions
  - Houston: $9.7 billions

- Estimated 51 state-level impacts for each of 47 USC sectors.
Direct Impact Estimations

- Available data for this application, from:
  - WISERTrade (Monthly Jan. 2003 through Mar. 2006 and Annually 2003) and
  - WCUS (Annually 2003)

- See Figure 1-1, for example. It shows foreign export losses, from comparisons of actual vs. projected performance.
Direct Impact Estimations (continued)

Figure 1-1.  Actual, Estimated, and Forecast Foreign Exports by Month

Katrina occurred
Direct Impact Estimations (continued)

- In all, four direct impacts, across all the USC sectors, were estimated
  - For the last four months (plus last five days in August) of 2005 and
  - For the first quarter of 2006.
Results

- Total (= direct + indirect) estimated impacts for the two periods for the U.S. for the seven+ months (Table 1a):

  Total U.S. losses

  -$62.1 billion
Results (continued)

Foreign Export Losses
-$11.1 billion

Domestic (to other states) Export Losses
-$39.4 billion

Foreign Import Losses
-$8.8 billion

Domestic (from other states) Import Losses
-$2.8 billion
Results (continued)

In terms of geographical distributions, the major total impacts outside Louisiana were in Texas and California (Table 1a)

- Texas: $2.5 billion
- California: $1.4 billion
Results (continued)

These impacts are mapped in Figures 2-9 of the paper.

Consider Figures 5 (total exports), 8 (total imports) and 9 (sum of total exports and total imports).
The State-by-State Total Economic Impacts of Hurricane Katrina and Rita on the Customs District of Louisiana: Case of Foreign and Domestic Exports Disturbances

Legend
- Less than $-800m
- $-800m to $-400m
- $-400m to $-200m
- $-200m to $-100m
- $-100m to $0m
- $0 to $200m
- $200m to $400m
- $400m to $800m
- $800m to $4b
- $4b to $8b
- More than $8b

Figure 5. The State-by-State, Total Economic Impacts of Reductions in Foreign and Domestic Exports Through the Customs District of Louisiana Following Hurricanes Katrina and Rita: August 1st 2005 through March 31st 2006.
Figure 8. The State-by-State, Total Economic Impacts of Reductions in Foreign and Domestic Imports Through the Customs District of Louisiana Following Hurricanes Katrina and Rita: August 1st 2005 through March 31st 2006.
Figure 9. The State-by-State, Total Economic Impacts of Reductions in Foreign and Domestic Imports and Exports Through the Customs District of Louisiana Following Hurricanes Katrina and Rita: August 1st 2005 through March 31st 2006.
Cautions

• These are short-term-impact analyses only.

• They may underestimate the capacity of the market to implement substitutes (our loss estimates are high).

• There may be some double-counting to the extent that some firms reduced output because of reduced demand for their product and because less was available for them to purchase (our loss estimates are high).

• But we omitted induced effect transmissions via the household sector (our loss estimates are low).
Conclusions and further work

- Unlike the modeling of hypothetical attacks, we will soon have state-level GSP data to help us evaluate this application of our model.

- Aggregating over the states runs the risk of netting out positive and negative impacts. State-level analysis is therefore important and useful.
Conclusions and further work (continued)

- The nation’s major ports and major facilities serve almost all of the states. We want to highlight these interdependencies.

- Further work on NIEMO to include interstate trade flows between (“nontradables”) service sectors will improve our analyses.