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Hurricane Harvey: Preliminary Estimates of Commercial and Public Sector Damages on the Houston Metropolitan Area

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Background

Hurricane Harvey came ashore in late August 2017 just south of the Houston-The Woodlands-Sugarland Combined Statistical Area. This area consists of five major municipalities located in nine counties. The area is home to roughly 6.5 million people, 125,000 businesses and extensive public infrastructure.

Damages, which were primarily the result of flooding were extensive. To estimate the total damages, we employ a model developed under contract with the Army Corps of Engineers, and subsequently used to estimate the damages related to Hurricane Katrina, and Floods in Memphis Tennessee and Pakistan (see various Burton and Hicks, 2003-2011)

Estimates

Adapting these models to the Houston area, we are able to provide estimates of flood damages which are more comprehensive than insurance estimates since they include both insured and uninsured damages to both public and private infrastructure, equipment, contents and commerce. These estimates appear in table 1.

Table 1: Estimated Damages	
Activity	Damage Estimates (\$1,000's)
Commercial Structures Damages	\$ 26,661,201
Commercial Equipment Damages	\$ 45,975,763
Residential Structures Damages	\$ 77,232,401
Residential Contents Damages	\$ 36,805,605
Commercial Revenues Damages	\$ 5,853,531
Electric Utility Damages	\$ 348,477
Highway Damages	\$ 3,851,920
Sewer System Damages	\$ 1,901,521
Total	\$ 198,630,419

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Thus, we believe damages to residential and commercial structures and contents and public infrastructure will be in the range of \$198 billion from Hurricane Harvey. These estimates are similar to our estimates of Hurricane Katrina (\$158 billion in 2005, or roughly \$194 billion in 2017 dollars). These are consistent with most other comprehensive damage estimates of Hurricane Katrina. Also, our estimate of Hurricane Katrina damages is similar to current comprehensive estimates (CEDIM, 2017).

Historically, public infrastructure damages are more difficult to estimate due to both the idiosyncratic nature of public infrastructure across cities, and the relative dearth of data on which to estimate damages in comparison to insured residential and commercial structures. However, this costly estimate is often ignored when providing initial estimates of damages.

The large impacts of Hurricane Harvey are consistent with a major hurricane impacting a very densely populated urban area, with extensive housing and commercial structure stock. Further, we would expect effects not explicitly modeled here, to include a short term spike in jobless claims and unemployment, concentrated around Houston and in industries affected by supply disturbances. We would also expect that this disruption could reduce GDP growth in 3rd Quarter by as much as 0.25 percent. Both of these impacts would be transient as increasing demand for labor and resumption of production would offset these declines by the end of 1st Quarter, 2018. Still, it is likely that damages from Hurricane Harvey are, as of September 8, 2017 the most costly in history.

Cited Studies

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