Hurricane Irma Economic Impacts on Pinellas County

Together with the Pinellas County Economic Development Department, the Tampa Bay Regional Planning Council (TBRPC) has conducted an analysis on the economic impacts of Hurricane Irma on the Pinellas County economy.

Hurricane Irma made landfall on the mainland of Florida on September 10, 2017 as a Category 3 hurricane. Using data and input from Pinellas County Economic Development, the Council considered storm impacts from three angles: loss of property, damage to accommodation industries, and temporary loss of employment to hourly wage earners throughout the economy.

Hurricane Impacts
Ahead of landfall, many residents of an affected area rush to restock their homes with food and supplies. When hurricanes do strike, wind and flooding damage can be catastrophic. Even if homes and businesses are undamaged, the loss of power results in near complete loss of local consumer spending as well as much business activity. Vital services, such as health care and welfare related activities, are often disrupted.

Of course, not all businesses suffer from hurricanes. For example, self-storage operators tend to benefit as evacuees store important items before leaving and often after returning to the area, while they repair their homes. As a share of all county employment, however, these businesses occupy a small niche.

Economists suggest that Florida’s economy will not rebound from the effects of Hurricane Irma until the fourth quarter of 2017 “when the business of repairing, rebuilding and replacing damaged homes, cars, equipment and infrastructure gets fully under way.”

Input Assumptions
The Council input data into REMI PI+ 2.1 into three simulation categories: damage to accommodation industries, loss of property, and changes in consumer spending and loss of hourly wages. These are described below.

Damage to Accommodation Industries
Depending on evacuation zone and availability of electricity, many coastal hotels closed prior to and during the storm, but quickly returned to operation once power was restored. Other hotels were at or near capacity with displaced families during and immediately after the storm. Overall,
the most directly impacted businesses were in food service, retail, and entertainment related industries since the loss of electricity meant that those businesses could not remain open. The Council estimated that approximately twenty percent of hotel workers were temporarily out of work, while all of those other industries shut down for about four days. As an estimate, TBRPC assumed a drop of $56 million in accommodation, restaurants, arts and entertainment related business sales in the period around the storm.

**Loss of Property**
According to Pinellas County Emergency Management, residential property losses amounted to $448 million, the majority of which fell under minor/affected categories. Commercial estimates were not available by the time this study was prepared.

<table>
<thead>
<tr>
<th>Residential</th>
<th>Destroyed</th>
<th>Major</th>
<th>Minor</th>
<th>Affected</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted Value of Damage</td>
<td>$1,477,001</td>
<td>$7,649,553</td>
<td>$119,451,775</td>
<td>$319,451,775</td>
<td>$448,030,104</td>
</tr>
</tbody>
</table>

**Dramatic Shifts on Consumer Spending Before the Storm; Temporary Loss of Hourly Wages**
In the days leading up to landfall, County residents increased spending at area retail and grocery stores in order to restock their homes with food and supplies. During and immediately after the storm, spending dropped to nothing for 4-5 days. Even as stores opened, many locations experienced severe shortages that continued into the following week, depressing sales for an extended period.

Estimating the magnitude of changes to consumer spending depends upon a guestimate of the variations in the County population during this period. While Pinellas County’s population is currently about 958,000, that figure includes about 80,000 seasonal residents and an approximate number of evacuees of 321,000. Less those two groups, that leaves a resident population of 557,200, or 257,965 households.

Assuming that most households restocked before the storm and spent about $150 a household, then sales would have increased by about $31 million. On the other hand, during the storm and the days afterwards, sales (measured as change in local consumption demand) decreased by about $100 million and a further $15 million in the following week as restocking took additional time. This estimate is derived from the estimated average weekly retail spending during 2017.

Overall, the loss of power throughout Pinellas County meant that most businesses were either closed or not running at capacity. Even with power, many employees were at home repairing damage or unable to return to work. Others remained outside of the region.

Since salaried workers are compensated differently from hourly employees, the Council assumed
that salary earning workers would have been compensated for days their place of employment was closed. Instead, only hourly wage earners would have been uncompensated during part of the week of September 10. Additional impacts are encountered by families with children since Pinellas County schools were closed for two weeks during the hurricane events. Without childcare, many families could not return to work.

Accordingly, the Council simulated the loss of hourly wages over a period of 4-7 days on the economy. The loss of hourly wages has indirect effects as well, because as household spending decreases there is less demand for household type services. On the other hand, there will be an increased demand for goods related to repair and maintenance due to storm damage. Those positive impacts are reflected in the property damage losses component of the study.

**Economic Impact Study Results**

Approximately 200,000 jobs were displaced and uncompensated during the week of September 10, 2017 and the days after the storm, not counting employment vacated by evacuees. However, that week is just a small portion of the year and as the annualized data in the table below show, the County economy is resilient and in comparison to the County economy as a whole, the hurricane’s impacts will rebound by early 2018.

<table>
<thead>
<tr>
<th></th>
<th>Pinellas 2017 Baseline</th>
<th>Pinellas County Annualized Hurricane Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>584,000</td>
<td>-3,179*</td>
</tr>
<tr>
<td>Output (Sales, $2016 Mil)</td>
<td>83,737</td>
<td>-$600</td>
</tr>
<tr>
<td>Gross County Product ($2016 Mil)</td>
<td>52,115</td>
<td>-$355</td>
</tr>
<tr>
<td>Personal Income ($2016 Mil)</td>
<td>52,824</td>
<td>-$160</td>
</tr>
</tbody>
</table>

*200,000 temporary job losses are converted to approximately 3,179 lost annual job-years (one job in one year) assuming 250 working days a year, of which an average of 4 days were uncompensated due to the storm.

**Glossary**

**Employment (job-years)** a standard description of a job held for one year. For example, if a construction worker works five years in one job, REMI counts that as five job-years. Alternatively, a REMI estimate of 10 jobs could either represent 10 workers working one year or 1 worker in one job for ten years.

**Output** The amount of production in dollars, including all intermediate goods purchased as well as value-added (compensation and profit). Can also be thought of as sales. Output = Self-Supply + Exports + Intraregional Trade + Exogenous Production.

**Gross Regional Product** as a value added concept is analogous to the national concept of Gross Domestic Product. It is equal to output excluding the intermediate inputs. It represents compensation and profits.

**Personal Income** This is a BEA concept based on place of residence; the sum of wage and salary disbursements, other labor income, proprietors' income, rental income, personal dividend income, personal interest income, and transfer payments, less personal contributions for social insurance. Reported as a nominal dollar concept.
About REMI Policy Insight

Founded in 1980, Regional Economic Models, Inc. (REMI) constructs models that reveal the economic and demographic effects that policy initiatives or external events may cause on a local economy. REMI model users include national, regional, state and city governments, as well as universities, nonprofit organizations, public utilities and private consulting firms. A major feature of REMI Policy Insight is that it is a dynamic model which forecasts how changes in the economy and adjustments to those changes will occur on a year-by-year basis. The model is sensitive to a very wide range of policy and project alternatives and to interactions between the regional and national economies. By pointing and clicking, you can answer the toughest “What if…?” questions about federal, state, local or regional economies.

Model Introduction

Tampa Bay Regional Planning Council’s REMI Policy Insight includes a REMI model that has been built especially for the Tampa Bay region version of the model and a state model. The model-building system uses hundreds of programs developed over the past two decades to build customized models for each area using data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Department of Energy, the Census Bureau and other public sources. The REMI model is a structural model, meaning that it clearly includes cause-and-effect relationships. The model shares two key underlying assumptions with mainstream economic theory: *households maximize utility* and *producers maximize profits*. Since these assumptions make sense to most people, the model can be understood by intelligent lay people as well as trained economists.

In the model, businesses produce goods to sell to other firms, consumers, investors, governments and purchasers outside the region. The output is produced using labor, capital, fuel and intermediate inputs. The demand for labor, capital and fuel per unit of output depends on their relative costs, since an increase in the price of any one of these inputs leads to substitution away from that input to other inputs. The supply of labor in the model depends on the number of people in the population and the proportion of those people who participate in the labor force. Economic migration affects the population size. More people will move into an area if the real after-tax wage rates or the likelihood of being employed increases in a region.

Supply and demand for labor in the model determine the wage rates. These wage rates, along with other prices and productivity, determine the cost of doing business for every industry in the model. An increase in the cost of doing business causes either an increase in price or a cut in profits, depending on the market for the product. In either case, an increase in cost would decrease the share of the local and U.S. market supplied by local firms. This market share combined with the demand described above determines the amount of local output. Of course, the model has many other feedbacks. For example, changes in wages and employment impact income and consumption, while economic expansion changes investment and population growth impacts government spending.
Model Overview

A pictorial representation of the model is adjacent. The Output block shows a factory that sells to all the sectors of final demand as well as to other industries. The Labor and Capital Demand block shows how labor and capital requirements depend both on output and their relative costs. Population and Labor Supply are shown as contributing to demand and to wage determination in the product and labor market. The feedback from this market shows that economic migrants respond to labor market conditions. Demand and supply interact in the Wage, Price and Profit block. Once prices and profits are established, they determine market shares, which along with components of demand, determine output.

The REMI model brings together all of the above elements to determine the value of each of the variables in the model for each year in the baseline forecasts. The model includes all the inter-industry relationships that are in an input-output model in the Output block, but goes well beyond the input-output model by including the relationships in all of the other blocks shown in the figure.

In order to broaden the model in this way, it was necessary to estimate key relationships. This was accomplished by using extensive data sets covering all areas in the country. These large data sets and two decades of research effort have enabled REMI to simultaneously maintain a theoretically sound model structure and build a model based on all the relevant data available.

The model has strong dynamic properties, which means that it forecasts not only what will happen but when it will happen. This results in long-term predictions that have general equilibrium properties. This means that the long-term properties of general equilibrium models are preserved without sacrificing the accuracy of event timing predictions and without simply taking elasticity estimates from secondary sources.

Prepared October 11 2017 by RD using REMI PI+ 2.1

1 https://www.wsj.com/articles/one-beneficiary-from-hurricane-harvey-self-storage-landlords-1505234126
2 https://www.wsj.com/articles/hurricanes-push-fed-off-course-1504722511
4 $150 per household drawn from several estimates of weekly household spending on groceries. See http://news.gallup.com/poll/156416/Americans-Spend-151-Week-Food-High-Income-180.aspx

Photo Courtesy of Rachel S. Harris