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Natural Disasters: From Destruction to Recovery

October 2011

Classroom Edition

An informative and accessible economic essay with a classroom application.

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Prepared by the Economic Education Group of the Federal Reserve Bank of St. Louis

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Natural Disasters: From Destruction to Recovery

October 2011

"What has so often excited wonder [is] the great rapidity with which countries recover from a state of devastation; the disappearance, in a short time, of all traces of the mischiefs done by earthquakes, floods, hurricanes, and the ravages of war."
—John Stuart Mill, *Principles of Political Economy*, 1848

On May 22, 2011, a tornado hit Joplin, Missouri, and damaged over 7,000 buildings and residences and resulted in 162 deaths. The estimated damage to insured buildings exceeds $1 billion, making it the largest insurance payout in Missouri history.

Major natural disasters can have significant economic consequences for local economies, including the loss of irreplaceable lives. In the short run, household incomes can be strained and government finances tied up with reconstruction efforts. However, reconstruction may generate benefits. Damaged technology may be replaced with newer technologies that have a positive impact on the lives of local residents.

A major observable outcome of a natural disaster is the destruction of capital—wealth in infrastructure, technology, and accumulated physical property. Such destruction, however, may also create opportunities in an affected area. Prior to a natural disaster, local governments may not have the incentive or resources to replace existing forms of capital with more productive ones; after a natural disaster, they may find it advantageous to improve lost capital. For example, local governments may choose to add better energy-conservation technologies to buildings or implement computer-based systems. Economic research finds that this substitution, in turn, may lead to increased economic growth.[1]

Natural disasters also alter labor market conditions. A significant number of workers may move from affected areas, reducing the local *labor supply* in the short run. Research on the impact of floods on employment in the United States finds that floods decrease employment in an affected region on average by 3 percent.[2]

The effects of a natural disaster on *labor demand* are uncertain. Some firms may want to fill job vacancies (increasing demand), while others may prefer to move to unaffected areas (decreasing demand). The changes in labor supply and demand will determine how average income adjusts in an affected area. A study on the impact of hurricanes in Florida on local labor markets, for example, finds that income per worker in affected counties rose up to 4 percent relative to that in nearby unaffected counties, as workers moved and labor demand increased.[3]

Natural disasters may also significantly alter the composition of employment, as experienced in Mississippi following Hurricane Katrina. From 2005 to 2007 in the hard-hit Gulfport-Biloxi area, reconstruction increased annual employment in the construction sector over 20 percent, while annual employment in the accommodation and food services sector decreased over 10 percent, possibly due to diminished tourism.

The benefits from a natural disaster can never compensate for the loss of life; however, understanding the effects of such disasters may aid future reconstruction efforts. As well documented after Hurricane Katrina and the Joplin tornado, it is important for a community to band together to replace what was lost and rebuild survivors' lives. Though less quantifiable, these actions help foster economic and emotional recovery. During 2011, severe natural disasters have affected many regions in the United States. As a result, future research will likely explore these phenomena and methods to alleviate consequences in vulnerable areas.

—By Constanza S. Liborio, Research Associate

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[1] See, for example, Albala-Bertrand, J.M. *The Political Economy of Large Disasters, with Special Reference to Developing Countries*. Oxford: Clarendon Press, 1993; and Skidmore, Mark and Toya, Hideki. "Do Natural Disasters Promote Long-Run Growth?" *Economic Enquiry*, 2002, *40*(4), pp. 664-88. Other research finds that after natural disasters it is difficult to replace dated technologies with better ones. See, for example, Benson, Charlotte and Clay, Edward J. "Understanding the Economic and Financial Impacts of Natural Disasters." Disaster Risk Management Series No. 4, World Bank, 2004.

[2] Sarmiento Camilo. "The Impact of Flood Hazards on Local Employment." *Applied Economics Letters*, 2007, *14*(15), pp. 1123-26. The author further finds that employment recovers after one year.

[3] Belasen, Ariel R. and Polachek, Solomon W. "How Disasters Affect Local Labor Markets: The Effects of Hurricanes in Florida." *Journal of Human Resources*, 2009, *44*(1), pp. 251-76.

Articles and Further Reading on Natural Disasters

"The Economics of Natural Disasters: A Survey," by Eduardo Cavallo and Ilan Noy. Working Paper Series No. IDB-WP-124, Inter-American Development Bank, May 2010.

Summarizes economic research on the determinants of the direct effects of natural disasters in the short and long run.

"The Effects of Natural Disasters on Long-Run Growth," by Aaron Popp. *Major Themes in Economics,* Spring 2006, pp. 61-82.

Provides a global perspective of the topic.

"Do Natural Disasters Stimulate Economic Growth?" by Drake Bennett. *New York Times*, July 8, 2008.

Explains positive possible outcomes of post-disaster reconstruction and innovation.

Free Data Sources and Resources

Resource: EM-DAT, International Disaster Database
Description: Provides international data on the effects of natural disasters from 1900 to today, including the frequency of natural disasters by type, casualties, and total damage cost by area.
Published by: Centre for Research on the Epidemiology of Disasters
Location: www.emdat.be/

Resource: *Katrina's Classroom: Financial Lessons from a Hurricane*
Description: Educational videos and lesson plans on aspects of financial responsibility (e.g., budgeting and use of credit) and how the Federal Reserve works in the wake of a natural disaster.
Published by: Federal Reserve Bank of Atlanta
Location: www.frbatlanta.org/forms/katrina.cfm

Resource: *Measuring the Economic Impact of a Natural Disaster*
Description: A video showing the perspective of economic historian Janet Hunter on the economic recovery from natural disasters, with a focus on the 1923 massive earthquake in Japan and the psychology of markets.
Published by: London School of Economics, April 2010
Location: www.youtube.com/watch?v=rPdvLfHYiOU

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Name___________________________________ Period_______

Federal Reserve Bank of St. Louis *Liber8*:

"Natural Disasters: From Destruction to Recovery"

After reading the article, enter the specified information and answer the following questions.

Joplin, Missouri, tornado (date)	
Buildings and residences damaged (number)	
Deaths (number)	
Estimated damage to insured buildings (dollar value)	

1. What are immediate and short-term costs of a natural disaster?

2. What long-term benefits might result from rebuilding after a natural disaster?

3. Natural disasters influence both the supply of and demand for labor.

- **How might natural disasters affect the supply of labor?**

- **How might natural disasters affect the demand for labor?**

4. How did Hurricane Katrina change the composition of employment in the Gulfport-Biloxi, Mississippi, area?

Teacher's Guide

Federal Reserve Bank of St. Louis *Liber8*:
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After reading the article, enter the specified information and answer the following questions.

Joplin, Missouri, tornado (date)	May 22, 2011
Buildings and residences damaged (number)	7,000
Deaths (number)	162
Estimated damage to insured buildings (dollar value)	$1 billion

1. What are immediate and short-term costs of a natural disaster?

Immediate costs include loss of life and property loss and damage. In the short run, household incomes can become strained and government finances tied up with reconstruction efforts.

2. What long-term benefits might result from rebuilding after a natural disaster?

After a natural disaster, replacement capital may be more productive than original capital, which may lead to increased economic growth.

3. Natural disasters influence both the supply of and demand for labor.

- **How might natural disasters affect the supply of labor?**

A significant number of workers may move from affected areas, reducing the local labor supply.

- **How might natural disasters affect the demand for labor?**

Demand for labor may increase if firms attempt to fill vacancies. Or, demand for labor may decrease if firms decide to relocate to unaffected areas.

4. How did Hurricane Katrina change the composition of employment in the Gulfport-Biloxi, Mississippi, area?

From 2005 to 2007, reconstruction increased annual employment in the construction sector 20 percent, while employment in the accommodation and food services sector decreased over 10 percent, possibly due to diminished tourism.

For Further Discussion

Display or distribute copies of the provided labor market graphs. Read the following to your students and lead a discussion based on the scenario and results provided.

The labor market works much like other markets:

1) Buyers and sellers interact in a market to determine a price. In the labor market, the good being bought and sold is labor and the price for that good is a wage.

2) In many of the markets we encounter, individuals such as you and I demand goods and services and firms supply those goods and services. Although the labor market works in a similar way, the roles reverse. In the labor market, firms demand labor and workers such as you and I supply that labor.

3) And, like other markets, the demand for labor and the supply of labor shift, which can cause prices—in this case wages—to increase or decrease.

Consider this scenario: A hurricane has caused wind damage and flooding to commercial buildings and homes in a medium-sized city. Listen to the following possible results, then choose which one of the four graphs best illustrates the given result: How will wages react? Will they increase or decrease? Explain your answer.

Teacher note: Although there are many factors that affect supply and demand in the labor market, remind students to focus only on the variable in question. Economists refer to this as ceteris paribus, or "all other things held constant."

Result 1: Many workers lose their homes and move to other parts of the country.

Graph D. When workers move to other parts of the country, the supply of workers in the city decreases: The labor-supply curve shifts to the left, resulting in higher wages for remaining workers.

Result 2: Many buildings must be repaired or rebuilt. Firms look for skilled construction workers.

Graph A. The demand for skilled construction workers increases: The labor-demand curve shifts to the right, resulting in higher wages for skilled construction workers.

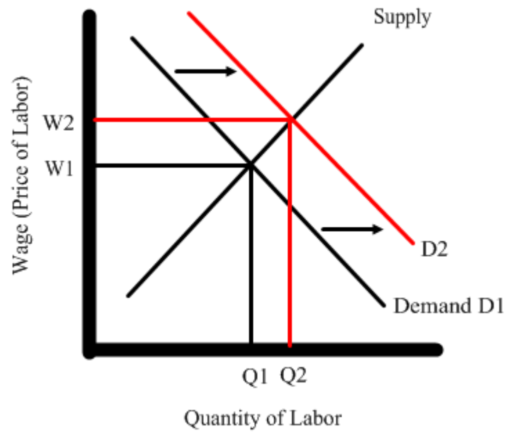
Result 3: At the time of the hurricane, the nation is experiencing a recession in the construction industry. Many unemployed skilled construction workers from surrounding areas look for construction jobs in the storm-damaged area.

Graph C. The influx of skilled construction workers from surrounding communities increases the labor supply: The labor-supply curve shifts to the right, decreasing wages for skilled construction workers.

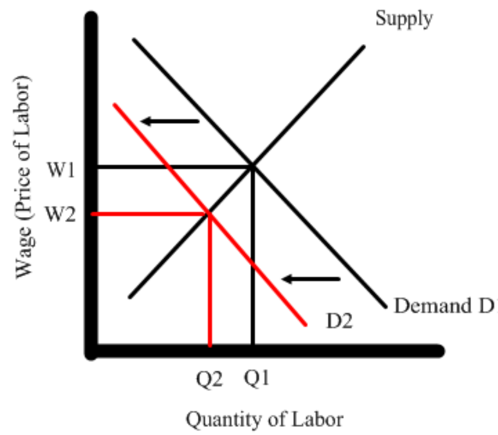
Result 4: The city struggled for decades to remain vital, and the hurricane dealt the final blow: Some of the city's largest employers relocate to neighboring cities rather than rebuild.

Graph B. As some of the city's largest employers move rather than rebuild, the demand for labor decreases: The labor-demand curve shifts to the left, resulting in lower wages for remaining workers.

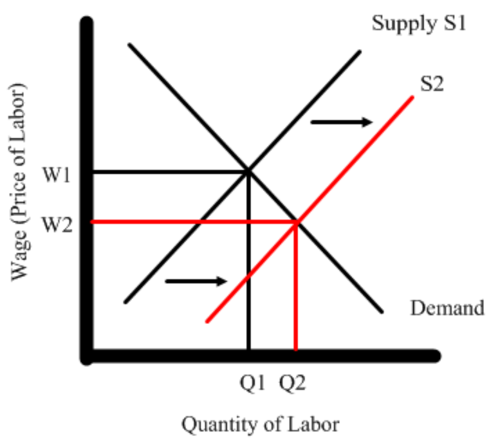
Graph A



Graph B



Graph C



Graph D