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Quantifying Climate Change Risks to the Cost of Municipal Borrowing.

Climate change is, of course, a threat to the entire planet. At our recent Municipal Finance Conference, we focused on the impact that climate change has on municipal borrowing costs and the $4 trillion muni bond market. You can read the three papers here and watch the video of the presentations here. Here is a quick summary of three paper on climate.

Communities that are especially exposed to heat stress pay more to borrow on the muni bond market, according to research that Tim Johnson of the University of Illinois Urbana-Champaign presented on behalf of his co-authors. Heat stress, they argue, is the primary channel through which climate change is projected to damage the economy—increase in energy expenditures, increase in mortality, increase in wildfires, and a decrease in labor productivity. Hurricanes can be severe, but the damage is generally localized. Johnson and co-authors use county-level data on heat stress exposure from two sources and link that to measures of prices on municipal bonds, corporate bonds, and equities. For municipal bonds, they find that a one standard deviation increase in heat stress exposure is associated with a 5 basis point (0.05 percentage point) increase in borrowing costs. For the average municipality, annual heat-related damages amount to 0.83% of GDP by the end of the century. Annual heat stress-related damages equal to 1% of GDP are associated with 15 basis points (0.15 percentage point) higher borrowing costs compared to municipalities not exposed to such losses. "Our consistent finding across all three asset classes of an increasing trend in the cost of capital associated with heat stress may be attributable to a perceived increase in the risk itself, or to increasing investor awareness of the risk and of its systematic nature," the authors write.

Investors are willing to pay more—or settle for slightly lower yields—for municipal green bonds, according to Baolian Wang of the University of Florida and his co-authors. Green bonds are defined as debt instruments designated to finance environmentally friendly projects. Looking at 1,027 pairs of bonds by the same issuer between 2013 and 2022, they find that the yield on green bonds was an average of 2.3 basis points (0.023 percentage point) lower than the yield on non-green bonds. They call the difference between the yield on a green bond and an otherwise identical conventional bond the "greenium," short for "green premium." They also find that before 2018, underwriters used to charge a higher fee in issuing green bonds as opposed to conventional bonds. In recent years, issuing green bonds has become cheaper.

Examining how and when natural disasters—more than 2,000 extreme weather events between 2005 and 2018—affect muni bond returns, Jun Kyung Auh of Georgetown University and his co-authors find that substantial price effects materialize in the weeks following a disaster. The average decline in returns is 31 basis points (0.31 percentage point) over the 20 weeks following a disaster. Between 1990 and 2020, the number of disaster and emergency declarations in the U.S. grew by almost 7% per year on average, and estimated physical damage from natural disasters caused by extreme weather events averaged over $11 million per affected county—and it's going to get worse, they say. Revenue bonds—as opposed to general obligation bonds—are hit harder. Although bigger disasters cause larger bond-price declines, federal disaster aid alleviates the negative price impacts substantially and seems to matter more than the physical damage; the largest price declines are in

less-affected counties that subsequently do not receive disaster aid. “Our findings imply that, absent changes in federal aid policy, municipalities will find local financing increasingly expensive in a world where natural disasters are more frequent,” the authors conclude.

The Brookings Institution

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