

Community Resilience and Adaptive Capacity: A Meaningful Investment Across Assets

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In a dark lower Manhattan where most buildings had lost power due to Hurricane Sandy, Goldman Sachs' lights shone bright in October 2012. While sandbags kept floodwaters out of the office building and a generator kept the lights on, New York City subways were flooded and hospitals had lost power and were evacuating patients in the middle of the raging storm. Against this backdrop, Goldman Sachs was both lauded and criticized for being an "island of resilience."¹ This event underscores the fact that internal risk management focused on protecting a company's own assets, while necessary, is insufficient. It must be bolstered by efforts to develop institutional resilience, understand how local communities are addressing physical climate risks, and identify opportunities for collaboratively advancing shared priorities.

The U.S. experienced 16 distinct large-scale natural disasters in 2017, together costing over \$300 billion.² Climate change is expected to lead to more frequent and severe acute hazards (e.g. hurricanes, floods, heat waves, and wildfires) as well as chronic hazards (e.g. water stress and rising sea levels).³ Investors across nearly every asset class are exposed. For example, while businesses experience costly disruptions during events like Hurricane Sandy, as described above, real asset investments are directly affected by physical damage due to climate risks. Consumer behavior in certain markets is beginning to respond to this risk. In the U.S., real estate exposed to ongoing and future sea level rise is selling at a seven percent discount compared to less exposed properties.⁴

As credit rating agencies increasingly incorporate climate risks into municipal ratings, municipal bond investments may be affected by downgrades, reflecting a concern that extreme weather events will adversely affect a city's ability to repay its debt. For instance, Moody's downgraded Port Arthur from A1 to A2 following Hurricane Harvey, citing its "weak liquidity position that is exposed to additional financial obligations from the recent hurricane damage, that are above and beyond the city's regular scope of operations."⁵

1 Keenan, J.M. "Sustainability to Adaptation and Back: A Case Study of Goldman Sachs' Corporate Real Estate Strategy," *Building Research & Information*, 43(6) (2015), pp. 407-422.

2 Ross, L. "The financial sector responds to physical climate risks," *PreventionWeb* (August 13, 2018), available at <https://www.preventionweb.net/experts/oped/view/59928>.

3 Intergovernmental Panel on Climate Change. "Special Report: Global Warming of 1.5°C" (October 2016), available at <http://www.ipcc.ch/report/sr15/>.

4 Bernstein, A., Gustafson, M., and Lewis, R. "Disaster on the Horizon: The Price Effect of Sea Level Rise," *Journal of Financial Economics* (May 3, 2018), available at http://leeds-faculty.colorado.edu/AsafBernstein/DisasterOnTheHorizon_PriceOfSLR_BGL.pdf.

5 The Bond Buyer. "Storm-damaged Port Arthur, TX receives a Moody's downgrade" (October 25, 2017), available at <https://www.bondbuyer.com/news/moodys-downgrades-hurricane-harvey-damaged-port-arthur-texas>.

Risks “Beyond the Fence” Matter

Both acute and chronic physical climate hazards can have impacts on local transportation, energy, communications and water infrastructure, and disrupt business by making facilities inaccessible for staff and customers. These impacts can in turn contribute to longer staff commutes or inability to get to work; damage or destroy facilities; and hinder the movement of people and goods. During Japan’s destructive rainfall in July 2018, Mazda Motor Corporation closed one of its headquarters and a factory for days despite incurring no major damage. Operations were closed because the homes of more than 100 company employees had been flooded and in many cases they faced challenges getting to work safely.⁶ After devastating fires in Sonoma County, California in October 2017, many vineyards, restaurants, and hotels still stood with minimal damage, but their workers lost homes and often had to leave the area, leading to significant challenges for businesses during recovery efforts.⁷ Vineyards experiencing minimal damage themselves struggled to communicate this to prospective visitors who continued to cancel and postpone trips.⁸

Every investment, from real assets to corporate initiatives, is inextricably connected to the surrounding community. Thus, understanding how acute and chronic physical climate hazards will affect local communities and how these communities are responding enables investors to assess the full extent of the risks they face. This, in turn, cannot be done without considering a community’s adaptive capacity, which mediates the impacts of climate hazards on communities and local infrastructure and has major implications for business continuity.

Adaptive Capacity is a Key Factor in Community Resilience

Understanding a local jurisdiction’s exposure to climate hazards is the first step in evaluating the impacts that climate change may have on the community. However, the extent to which significant disruptions or losses occur will also depend on a city’s adaptive capacity, defined as the ability to “adjust to climate change (including climate variability and extremes) to moderate potential damages, take advantage of opportunities, and cope with the consequences.”⁹ Local adaptive capacity can differentiate those cities that incur enduring damage from those that do not during similar events.

For instance, during Chicago’s 1995 heat wave, local adaptive capacity strongly influenced outcomes for the neighborhood of Englewood, which experienced one of the highest

6 Kyodo. “Water outages continue in flood-hit areas across western Japan, as death toll tops 170,” *The Japan Times* (July 11, 2018), available at <https://www.japantimes.co.jp/news/2018/07/11/national/water-outages-continue-flood-hit-areas-across-western-japan-death-toll-tops-170/#.W4hz2ehKiM9>.

7 Jordan, M. “As Fires Move On, Wine Country Wonders Whether Immigrants Will, Too,” *The New York Times* (October 17, 2017), available at <https://www.nytimes.com/2017/10/17/us/california-fires-immigrants.html>.

8 McCallum, K. “Sonoma County grapples with tenuous economic recovery after October wildfires,” *The Press Democrat* (April 28, 2018), available at <https://www.pressdemocrat.com/news/8245364-181/sonoma-county-grapples-with-tenuous?sba=AAS>.

9 U.S. Global Change Research Program (USGCRP). “Glossary,” available at <https://www.globalchange.gov/climate-change/glossary>.

death rates during the event, and Auburn Gresham, whose death rate was lower than many of Chicago's affluent neighborhoods.¹⁰ Both neighborhoods have majority African American populations suffering from high poverty and unemployment rates. But the latter benefited from greater connectivity, including sidewalks, restaurants, and other places that brought residents together. This fostered a sense of social cohesion that incentivized neighbors to look out for each other and check on vulnerable individuals, such as elderly people living alone.¹¹

Adaptive capacity captures a wide range of interacting factors, including the policy context within a community; the strength and investment of public infrastructure; the local jurisdiction's fiscal means and personnel capacity; and its ability to design, plan, implement, execute and manage tangible adaptation investments. Understanding these complex and interacting characteristics provides an important indication of how a city may be able to manage its risks from climate change and how the assets within a community may be affected.

Assessing Adaptive Capacity at Scale

Adaptive capacity is a well-researched concept.¹² Four Twenty Seven, a climate risk analytics firm that helps investors, companies, and governments understand the economic and financial impacts of physical climate risks, has leveraged insights gained from working with cities and investors, and built on the extensive peer-reviewed literature to develop a methodology for assessing community adaptive capacity from a private-sector perspective. Key factors in local adaptive capacity include risk assessment, planning, budget and staff allocation, and community engagement. Is climate addressed reactively by emergency management teams, or is a local jurisdiction taking steps to proactively understand its risk and build resilience? Is there a specific department dedicated to climate change impacts or is it bundled into several other priorities? Is there evidence of adaptation in the built environment, through building codes, flood management or urban greenery? Is the community well-informed about its exposure to climate risks and ways to individually prepare?

Assessing these factors for a single city requires expertise and effort. Evaluating the elements of adaptive capacity across a portfolio of jurisdictions presents significant barriers in terms of obtaining comparable data that is informative across a set of communities characterized by different sizes, economies, and demographics. Effective budget allocation, efficient community outreach, and numbers of cooling centers, for example, will depend on a city's size, population characteristics, and risk exposure. Comparing these numbers across a set of jurisdictions does not provide an informative comparison of community adaptive capacity unless the analysis is sensitive to jurisdictions' unique contexts.

10 Klinenberg, E. "Adaptation," *The New Yorker* (January 7, 2013), available at <https://www.newyorker.com/magazine/2013/01/07/adaptation-eric-klinenberg>.

11 Ibid.

12 Moser, S.C. and Boykoff, M.T. (eds.) *Successful Adaptation to Climate Change*, Routledge (2013); Smit, B. and Wandel, J. "Adaptation, adaptive capacity and vulnerability," *Global Environmental Change*, 16(3) (2006), pp. 282-292; and Engle, N.L. "Adaptive capacity and its assessment," *Global Environmental Change*, 21(2) (2011), pp. 647-656.

With these caveats in mind, Four Twenty Seven begins by obtaining a high-level understanding of local jurisdictions' adaptive capacity through the examination of key factors. Focusing on high-level indicators provides a valuable comparison at scale, which can highlight cities that may warrant a closer inspection. Informative indicators include data on number of trees per square foot of impermeable surface; whether a city participates in the Federal Emergency Management Agency's (FEMA) community rating system for flood mitigation; and the existence of adaptation, local hazard mitigation, and other relevant plans that provide an indication of how a community is building its adaptive capacity through operations and capital investments.

To inform adaptation planning and risk analysis for specific assets, it is useful to obtain a more nuanced understanding of the surrounding city's adaptive capacity, and hazard-specific efforts are important elements of this assessment. For example, for investors with an interest in several coastal cities exposed to sea level rise, Four Twenty Seven examines cities' coastal adaptation efforts. Likewise, for cities in the Midwest or California's Central Valley that are often exposed to drought conditions, water management plans can be an important indication of adaptive capacity.¹³

Credit rating agencies provide one perspective on how investors can examine adaptive capacity, as they are actively considering the most effective ways to incorporate climate risk and adaptive capacity into their ratings. S&P Global Ratings and Moody's ask questions about how climate risks will affect each component of their frameworks for rating cities: how will an extreme event affect the tax base? Are capital and long-term financial planning prepared for unexpected costs? Are risk mitigation capital projects undertaken wisely, or are risks deferred? What is the city's level of indebtedness, and how will it be affected by extreme events?

For example, during Hurricane Harvey about 60 percent of Rockport, Texas residents were displaced, and a significant number of buildings were damaged. S&P Global Ratings downgraded the city due to a decline in its tax base and revenues, as well as its weak budgetary performance and lack of fiscal flexibility.¹⁴ In contrast, municipal utility districts were also damaged, but were not downgraded largely due to their significant debt reserves, suggesting a continued ability to repay.¹⁵ Thus, the utility districts were understood to have greater adaptive capacity in terms of fiscal stability due to their reserves as well as the accounting and risk management processes that identified and accounted for such reserves.

Regardless of asset class, investors can identify priorities around community adaptive capacity and focus on understanding these comparable components across a set of cities. Rating agencies emphasize the challenges of matching time horizons and obtaining clear disclosures from issuers. Investors have the opportunity to address these challenges

13 Steinberg, N. et al. "Assessing Exposure to Climate Change in U.S. Munis," Four Twenty Seven (May 2018), available at <http://427mt.com/wp-content/uploads/2018/05/427-Muni-Risk-Paper-May-2018-1.pdf>.

14 Schroer, L. "Assessing the Impacts of Climate Change on U.S. Municipal Ratings. Webinar: Building City-level Climate Resilience," Four Twenty Seven (May 2018), available at <http://427mt.com/2018/05/24/webinar-building-city-level-climate-resilience/>.

15 Ibid.

through their unique relationship with issuers. By engaging with companies, communities or property managers, investors can promote climate-related financial disclosures which will improve the availability of comparable data across the nation.

Fostering Organizational and Community Adaptive Capacity

Shareholder engagement is a powerful tool that benefits both corporations and their investors.¹⁶ Four drivers of collaborative organizational resilience-building include: (i) fostering long-term sustainability to improve competitiveness; (ii) protecting the value chain including suppliers, clients, and employees; (iii) improving reputation; and (iv) capitalizing on opportunities to innovatively address climate risks.¹⁷ Shareholder engagement promotes these outcomes.

Equity and fixed-income investors can engage with companies in their portfolio to promote adaptation efforts that look beyond internal resilience investment to the external community. For example, recognizing its own exposure to flood impacts while also acknowledging its dependence on the surrounding community, Facebook collaborated with the San Francisquito Creek Joint Powers Authority and contributed \$200,000 to assess the regional impacts of floods and sea level rise. By engaging in community efforts to evaluate exposure and supporting community adaptation efforts, Facebook strengthened its understanding of its own vulnerabilities and inundation risks and also improved its local relationships and regional reputation.¹⁸ As shareholders, investors have the opportunity to engage directly with companies in their portfolios and ask questions about the surrounding infrastructure and community to better understand a company's climate risks and organizational resilience, as well as encourage the companies to improve their own understanding of these issues.

Municipal bond investors can incentivize community resilience by investing in those communities that have high adaptive capacity and are seriously addressing their risks to climate change, as demonstrated by efforts to assess their risks and implement tailored projects to address them. Engaging directly with potential investments allows investors to ask questions regarding a municipality's planning for climate change and how events such as an extreme storm or enduring heat wave may affect its tax base. Infrastructure and real estate investors can foster community resilience by engaging with communities and property

16 LaManna, M. "From Risk to Resilience—Engaging with Corporates to Build Adaptive Capacity," Four Twenty Seven (June 2018), available at http://427mt.com/wp-content/uploads/2018/06/Engaging-with-Corporates-to-Build-Adaptive-Capacity_427-June-2018.pdf.

17 United Nations Global Compact. "The Business Case for Responsible Corporate Adaptation: Strengthening Private Sector and Community Resilience. A Caring for Climate Report" (2015), available at <http://427mt.com/wp-content/uploads/2015/12/Caring-For-Climate-Business-Case-Responsible-Corporate-Adaptation-2015-1.pdf>.

18 Joint Francisquito Creek Joint Powers Authority. "SAFER Bay Project: Public Draft Feasibility Report" (October 2016), available at http://www.sfcjpa.org/documents/SAFER_Bay_Public_Draft_Feasibility_Report_Summary_Oct_2016_.pdf.

managers around planning for the duration of an asset's life cycle. Understanding the adaptive capacity of the surrounding city provides a valuable indication of how an airport, toll bridge, or other infrastructure assets may be affected by changes in road conditions, structural damage, and consumer behavior during an extreme event. It also lays the groundwork for effective public-private collaboration to build adaptive capacity that leads to climate resilience and reduced loss.

Understanding the vulnerabilities of specific assets can guide meaningful collaboration around climate resilience. For example, certain manufacturing facilities are particularly vulnerable to water stress as they rely on water for cooling and washing processes. Questions around the intersection of climate risk exposure and adaptive capacity at a site and in the wider community enable investors to understand their climate risks and identify opportunities for strategic engagement and investment. For instance, in areas that are prone to water stress, how are water supply and demand changing? How are local jurisdictions planning to ensure that water supply continues to meet changing residential, commercial, and industrial demand? Can an investor foster climate resilient water practices within its own assets, that may help ensure a sustainable supply for both the community and assets for their full life cycle? Investors are in a unique position both to engage with prospective and current investments to understand their exposure to climate risks and also to leverage their position as shareholders to promote resilience and adaptation strategies that consider both internal processes and community adaptive capacity.

Conclusions

Acute and chronic climate hazards and stresses have financial consequences for businesses, investors, and communities through direct impacts, such as damaged and destroyed assets, and indirect impacts such as damaged infrastructure that disrupts energy or water supplies and leads to inaccessibility for employees and customers. As assets are inextricably linked to their surrounding communities, understanding the potential financial risks that climate hazards pose requires understanding asset-specific climate vulnerability, as well as local and regional adaptive capacities. A community's critical infrastructure, adaptation planning efforts, and financial resources are all important components of its ability to manage the impacts of climate hazards and can be effective entry points for businesses and investors to collaboratively build adaptive capacity. Investors cannot thrive unless the communities in which they invest do and each asset class has a unique relationship with the surrounding community that can be leveraged to foster climate resilient communities and economies.

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