ESG Perspectives

Climate Risk & Municipal Credit Ratings

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How Does a Municipality's Climate Risk and Readiness Stack Up to Its Credit Rating?

by John Sama & Nick Erickson

As climate-related events have increased in frequency and magnitude, they have moved to the forefront of ESG investors' minds. How well companies and municipalities prepare for the risks of climate change is not simply an "E" issue, but "S" and "G" issues as well. Extreme heat has implications for food production, clean air and drinking water, transportation, and overall human health. At Sage, we have written extensively and firsthand about melting ice in the arctic, caused by increasing global temperatures, and its effects on wildlife and food production. We have also written about natural disasters, such as wildfires in California that last year burned over a quarter of a million acres of land and has created crises for multiple industries, including residential housing and insurance. The current pandemic may ultimately be blamed in part on the vulnerability of densely populated areas and the merging of ecosystems that were never meant to blend.

Until recently, credit rating agencies did not explicitly factor climate change risks into their ratings process; but that is starting to change. For example, last year Moody's acquired a major stake in Four Twenty Seven, a company that analyzes the risks to corporations and governments from climate change events. Both analysts and investors are driving the need for more information about the risks of climate change and their effects on the financial stability of institutional borrowers worldwide.

In this report, we determine if a correlation between climate risk and preparedness exists within municipal credit ratings. We utilized data from Notre Dame Global Adaptation Initiative (ND-GAIN) from October 2018. The data provides metrics for various climate risk categories, including drought, heat, cold, floods, and sea level rise. Each of these categories has various metrics that are used to calculate a single score for the category. These scores are then used to create two scores for each municipality: overall risk and overall readiness for climate change. We took these scores and compared them to the composite credit rating of each municipality.

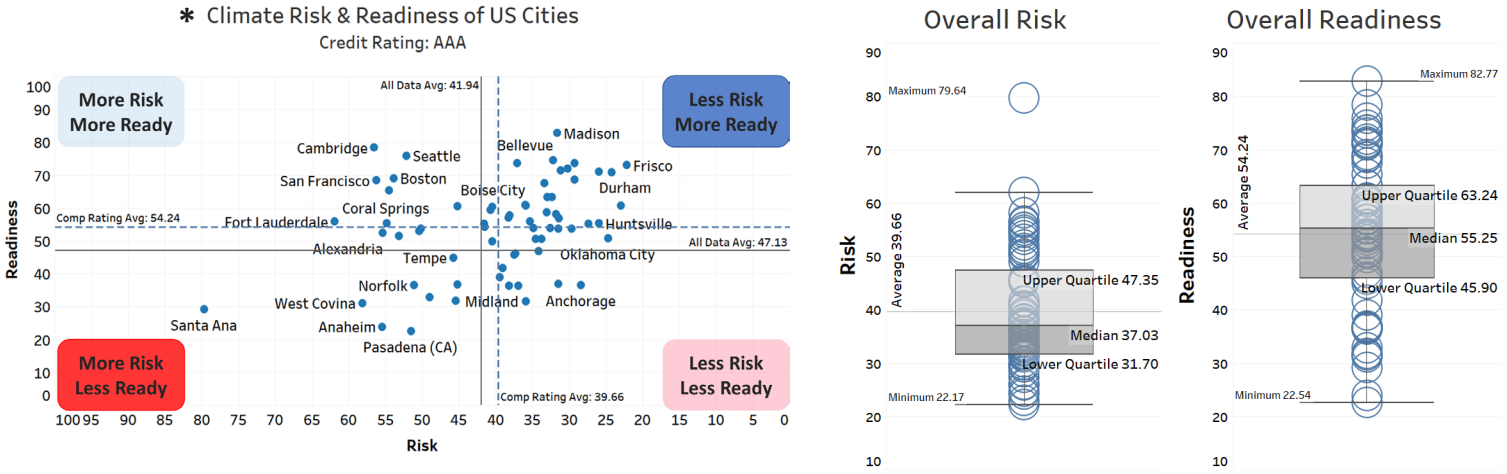
Urban Adaptation Assessment (UAA)

Notre Dame GAIN's Urban Adaptation Assessment (UAA) collects data from over 270 U.S. cities that have populations above 100,000 and analyzes how vulnerable they are to various climate events. The UAA provides two scores for each municipality: overall risk and overall readiness. The risk score considers the exposure both people and critical infrastructure have to a climate-hazard event, as well as the degree to which they are exposed. Readiness has three components: economic, social, and governance. The UAA also analyzes the preparedness of a municipality and how well it could adapt to a climate-hazard event, whether it has the means to shift resources and the ability to adapt policy to absorb costs.

As we look across U.S. municipalities for fixed income investing opportunities, climate change preparedness is a top consideration. At Sage, we take a holistic approach by looking at trends, geographic regions and their climate change exposure, and how municipalities are preparing for the next climate change-related event. When we analyze climate change preparedness, it is important to determine that 1) it is being managed over the long-term, and 2) it can be linked to a municipal credit's rating. A key component of our Climate Change Readiness Framework is data published by the University of Notre Dame Global Adaptation Initiative (ND-GAIN). It is a robust set of data that encompasses multiple types of climate risk, making it easier to tie the data to actual municipal credit ratings.

AAA-Rated Cities

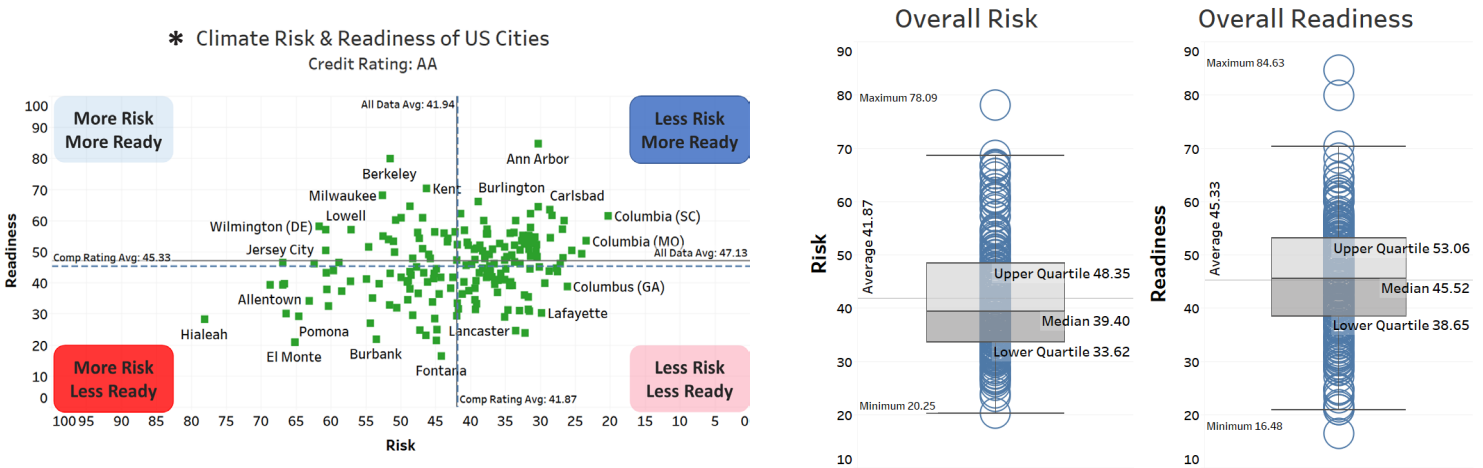
As we expected, the cities with AAA credit ratings had the highest average readiness and lowest average risk; however, the data showed a weak linear correlation between the risk and readiness. This means that for the most part, AAA-rated municipalities are overprepared for the level of risk they face, but this over-preparedness isn't necessarily intentional. It could be that they happen to reside in a geographical area that carries a much lower overall climate risk (we will explore this in a future post). Regardless of the reason, AAA-rated municipalities tend to be overprepared for the level of climate risk they face, and the available financial resources to support these programs is reflected in their credit rating and subsequently the yields on their municipal bonds.



Charts: The box plot shows that the AAA-rated municipalities are significantly overprepared for their level of risk. This translates to the quadrant chart where a high number of cities are in the upper right quadrant.

AA-Rated Cities

AA-rated cities have the most data points and are primarily grouped in the middle of the risk/readiness chart. Their average overall risk score and readiness scores are close together (45 readiness, 42 risk), which indicates an adequate amount of preparedness for the level of risk faced, but they show a weak linear correlation between their risk and readiness. On average, AA-rated municipalities tend to be either overprepared or underprepared for the level of climate risk they face, and there may be AA-rated municipalities that carry either increased or reduced climate-related risks that are not reflected in their valuations. Therefore, investors should be wary about applying a blanket valuation, and each credit should be evaluated on its own merits regarding climate-related exposure and the municipality's level of preparedness.

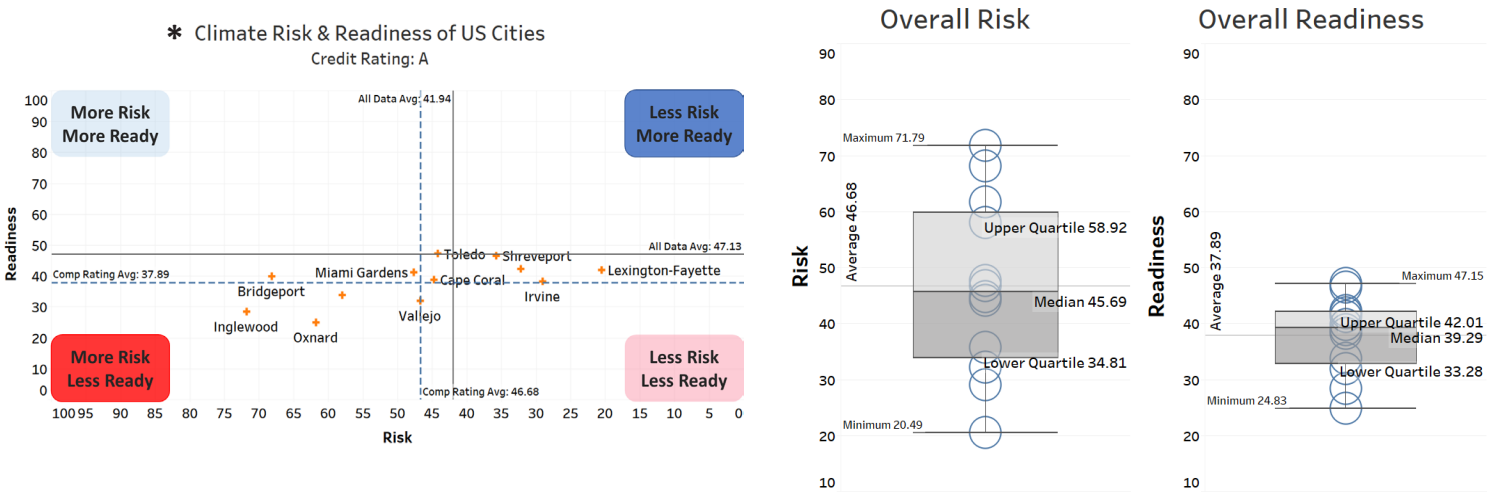


Charts: The box plot shows that the middle 50% of risk and readiness of AA-rated municipalities are closer in value than other credit ratings. This translates to the quadrant chart where the data points are primarily located around the center in a circle-like shape.

* The scatter plots have two sets of average lines: the solid gray lines are the average risk and readiness of all the data points combined; these two lines will stay the same throughout. The dashed blue lines are the average risk and readiness for the data of the specific credit rating being analyzed; these lines will change for each credit rating. Also note that outliers have not been removed from the data analysis.

A-Rated Cities

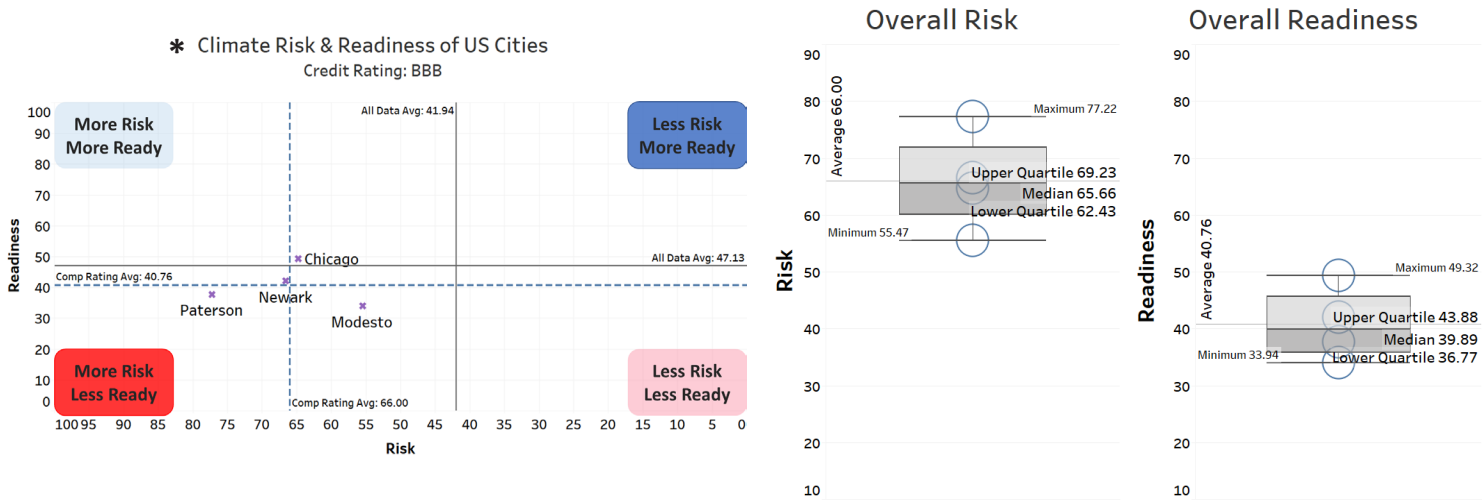
According to the data, A-rated municipalities have an average amount of climate risk, but a lower amount of overall preparedness. While on the surface this seems troubling, A-rated municipalities have the strongest overall correlation between their overall risk and readiness. This indicates that A-rated municipalities seem to be doing a satisfactory job of allocating the appropriate amount of resources to address their climate readiness based upon the amount of overall climate risk they are expected to face. Identifying A-rated municipalities that appropriately match their overall preparedness and risk, and appropriately address their current financial obligations, can provide investors with the opportunity to add incremental return while helping minimize additional risk, climate or otherwise, that comes with investing in A-rated municipalities.



Charts: Although the number of data points is small, they show that A-rated municipalities are generally underprepared for their level of climate risk. A-rated municipalities are on average the least prepared compared to other credit ratings.

BBB-Rated Cities

BBB-rated municipalities' average risk is much higher than their average readiness, and they have a weak negative correlation between their risk and readiness. This indicates that there is no real relation between a BBB municipality's overall risk and their overall climate preparedness. Therefore, when evaluating BBB-rated municipalities, investors must do appropriate due diligence on a case-by-case basis to determine if they are being adequately compensated for the higher level of overall climate risk they face.



Charts: Due to the small data sample available for BBB it is difficult to make any meaningful inference from the data analysis. The sample available shows a slight negative correlation, meaning that moving higher on the risk scale will show a decline of readiness. This relationship can be seen in the box plots analysis of risk and readiness. The median and average risk for these municipalities show to be significantly higher than the same measures of readiness. This is a trend we expected but would need more data points to be certain.

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Conclusion

The data shows a trend that municipalities with higher credit ratings have on average a higher difference between readiness and risk. This is illustrated by the values in the bottom row of the chart below. The AAA-rated bonds had the largest positive difference between the two measures, showing that on average they are more than prepared (ready) for their level of risk. The value of this calculation declined as credit quality diminished. For the A credit rating, the value of this calculation became negative, meaning that on average the municipalities had higher levels of risk for their levels of readiness. This trend continued to become more severe at the lowest analyzed credit rating of BBB. Overall, this trend was in line with our expectations.

We believe the data shows that there are investing opportunities among the lower-rated municipalities that correctly identify their expected future climate risk and prepare for that risk at an adequate level; however, it would be an oversimplification to say that is the case for every municipality. Not every A-rated security is a good investment opportunity as compared to all other higher-rated credits. Pinpointing the reason why necessitates a deeper dive into why discrepancies exist among higher-rated credits. Identifying municipalities' population densities and geographic locations could help create a clearer picture of where the opportunities lie and will be the focus of our next piece.

	AAA	AA	A	BBB	ALL DATA
Number of Cities	67	188	12	4	271
Risk Readiness Correlation	0.33	0.25	0.61	(0.16)	0.31
Avg. Readiness	54.24	45.33	37.89	40.76	47.13
Avg. Risk	39.66	41.87	46.68	66.00	41.89
Avg. Readiness - Risk	14.57	3.46	(8.79)	(25.24)	5.24

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