Incorporating Environmental Risks in Credit Ratings

Leonard Jones, Managing Director, US Public Finance

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Key Takeaways

• Credit impact of physical climate change is captured in our State and local government methodologies by way of broad rating factors that reflect a government's ability and willingness to repay its debt

• Government’s susceptibility to environmental risk will depend on its exposure and resilience to the physical effects of climate change

• We also recognize the variability of exposure by region and other factors that enhance issuer resilience
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Background on Moody’s approach to assessing ESG risks in credit analysis
Credit ratings, time horizons and ESG

» We seek to incorporate all relevant credit considerations with the most forward looking view that visibility permits

» However, we do not integrate the impact of long-term risks with great degree of precision given that uncertainty increases as timeframes lengthen

Near-term risks are typically more meaningful and have a more direct impact on ratings

As timeframe lengthens, probability and impact of risks become less certain, as does importance relative to other risks

A longer time frame provides companies with greater capacity to take mitigating (or self-damaging) actions in response to risks

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Our ratings capture ESG considerations with material credit implications

Illustrative example of how ESG considerations are incorporated into our corporate credit analysis

Sources: Moody’s Investors Service
Our research highlights ESG themes with broad sector implications

- 2015 study assessed 86 sectors globally ($68trn in rated debt) for credit exposure to five categories of environmental risk.

- These can generally be thought of as “physical risk” and “transition risk”.

- Considered both materiality & timing of risks.

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**MOOdy’S INVESTORS SERVICE**
2 Climate Change – Trends vs. Shocks
Climate Trends vs Climate Shocks

Incremental climate trends exacerbate extreme climate shocks

» Climate trend: Reflect gradual changes in the climate over multiple decades with little visible change from one year to the next, including incremental increases in avg. annual temps., and reduction in cold weather extremes. Changes in climate gradually increase sea levels, create more extreme precipitation patterns and produce more driven weather extremes.

» Climate Shock: Refers to extreme weather events such as droughts, floods, wildfire and heat waves that are forecast to increase in frequency and intensity over time due to changing climate.
Physical Effects Manifest as Climate Trends and Climate Shocks

Credit implications of climate trends and shocks will vary depending on time frame and magnitude of impact

Source: Moody’s Investors Service, Intergovernmental Panel on Climate Change
3 US Exposure and Vulnerability to Climate Change
US facing increased vulnerability to severe heat and rising sea levels

- **Rising Temperatures**: The National Climate Assessment (NCA), indicates that average US temperatures have risen by 1.3 degrees to 1.9 degrees Fahrenheit since 1895, with the majority of the increase having occurred since 1970.

- **Sea Level Rise**: The National Ocean Service forecasts that global average sea level rise will continue. In 2014, the global average sea level rise was about 2.6 inches above the 1993 average.
Temperatures forecast to increase depending on future emissions levels

Source: National Climate Assessment
Sea levels have risen
Gulf Coast most acutely affected

Source: National Oceanic and Atmospheric Administration
Sea levels forecast to continue to rise through 2100
Gulf Coast projected to be most impacted

Natural disasters have become more frequent

Source: Moody's Investors Service, EM-DAT International Disaster Database
4 Moody’s Approach to Analyzing the Credit Risk of Climate Change
Climate risks are embedded in our approach to analyzing the key credit factors in our methodologies

- Our rating methodologies for states, local governments and public utilities do not explicitly address climate change as a credit risk.

- However, the credit challenges of climate change are captured in our analysis of economic strength and diversity, capital asset management, fiscal strength and governance, among other credit factors.

- Local governments facing elevated risk of climate shocks are asked by analysts during the rating process about their preparedness for such shocks and their activities in respect of adapting to climate trends.
We identify the primary public sector issuer credit risks of climate change as:

Source: Moody's Investors Service
Example of how climate risk can be transmitted to credit risk

- Sea-level rise → Increased coastal storm damage → Increased property damage, increased infrastructure costs, cost of adaptive strategies
- Warmer temperatures → Increased frequency and severity of droughts, wildfires and heat waves → Compromised crop yields, increased energy demands, higher mortality rates, loss of labor productivity, cost of adaptive strategies

**NEGATIVE CREDIT IMPLICATIONS**

**BALANCE SHEET**
- Assets
  - Impaired assets
- Net assets
- Reserves
- Debt
- Other liabilities
  - Inability to refinance
  - Higher liabilities

**STATEMENT OF FINANCIAL PERFORMANCE**
- Revenue
  - Lower tax revenue e.g. property tax, state tax
- Expenses
  - Higher expenses e.g. public works, disaster recovery costs
- Additional debt to finance recovery
- Increased debt
Analysis of key credit factors captures local government resilience

Credit impact of climate risks captured in Local Government General Obligation methodology

- **Economy and Tax Base** (30%): Issuers with economies concentrated in sectors exposed to climate risks face higher credit vulnerability. Small economies that can be disproportionately impacted by climate events are at a heightened risk.

- **Finances**: (30%): Fiscal flexibility can be challenged by unanticipated emergency response costs, infrastructure repair costs, the loss of revenue or the cost of adaptive strategies. Issuers with healthy overall financial positions and strong liquidity are best positioned to service these risks with minimal credit impacts.

- **Management** (20%): Issuers with established and well-developed emergency management, financial, capital and debt plans will be best suited to overcome climate stressors.

- **Debt/Pensions** (20%): Entities with low, manageable debt profiles will benefit from having capacity to incorporate obligations to finance capital improvements.
US states' exposure and overall susceptibility to climate change

Exposure to climate change risks

Source: Moody’s Investors Service
5 Long Term and Short Term Issuer Resilience
Local, state and federal tools for immediate response and long-term recovery enhance resilience to credit risks of climate shocks

➢ The availability of resources at multiple layers of government is an important element that broadens the response capabilities of local issuers and their ability to mitigate credit impacts.

➢ State governments monitor and evaluate the effectiveness of local response efforts and, if needed, provide both immediate response and long-term recovery assistance.

➢ Under FEMA, the federal government coordinates the provision of essential emergency response services through a variety of federal agencies. These services include, among others, transportation, communications, public works and engineering, mass care, food, energy, and search and rescue.
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Leonard Jones
Leonard.Jones@moodys.com
212-553-3806

Eric Hoffmann
Eric.Hoffmann@moodys.com
212-274-1702

moodys.com
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