The Fundamentals of Financial Risks from Climate Change
Community and Regional Banking Institutions

Yue (Nina) Chen, Dir. of Sustainability and Climate Initiatives
February 18, 2021
Goals of the Webinar

- Orientate you to current climate change issues
- Identify financial risk from climate change
- Share ways to identify and manage climate risks, opportunities, and support for best practice
- Update on federal climate actions
Source: National Oceanic and Atmospheric Administration
Primary Climate Risk Factors on Financial Markets

Physical Risks

- Direct
  - Flood
  - Hurricanes
  - Wildfire
  - Heat Waves
- Indirect
  - Disruption to supply chains

Transition Risks

- Driven by the transition to a low-carbon economy
- Re-pricing of carbon-intensive financial assets
Climate Change and Flooding – Sea Level Rise

Source: Climate Central
Storm Surge + Sea Level Rise ➔ More Flooding

NYC Properties at Risk of Storm Surge

<table>
<thead>
<tr>
<th></th>
<th>Total Estimated Reconstruction Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family Residential</td>
<td>$285 billion</td>
</tr>
<tr>
<td>Multifamily Residential</td>
<td>$49 billion</td>
</tr>
<tr>
<td>Combined</td>
<td>$334 billion</td>
</tr>
</tbody>
</table>

Source: [Climate Change.com](http://Climate Change.com)

Source: [CoreLogic 2020 Storm Surge Report](http://CoreLogic 2020 Storm Surge Report)
Nuisance Flooding from Sea Level Rise

- The Battery, Kings Point, and Montauk could have 100 days a year of nuisance flooding by 2050.

In Florida, areas with higher risks to sea level rise → Lower home prices

Source: New York City Panel on Climate Change 2019 Report Chapter 4: Coastal Flooding
Climate Change and Flooding – Heavier Rains

Observed U.S. Trend in Heavy Precipitation

Hurricane Irene Damage in Keene, NY

Source: U.S. Climate Resilience Tool Kit

Source: Adirondacks Lifestyle
What is the Flood Risk in New York City?

Comparison of FEMA 2007 Map vs. 2015 Preliminary Map

<table>
<thead>
<tr>
<th>In Flood Zones</th>
<th>2007 Map</th>
<th>2015 Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
<td>218,000</td>
<td>400,000</td>
</tr>
<tr>
<td>Jobs</td>
<td>214,000</td>
<td>290,800</td>
</tr>
<tr>
<td>Buildings</td>
<td>36,000</td>
<td>71,500</td>
</tr>
<tr>
<td>1-4 Family</td>
<td>26,000</td>
<td>53,000</td>
</tr>
<tr>
<td>Multifamily</td>
<td>3,200</td>
<td>5,300</td>
</tr>
</tbody>
</table>
Flood Risk in Buffalo

- Additional properties at risk: 16,010

<table>
<thead>
<tr>
<th>Estimation Source</th>
<th>Share of Properties at Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMA</td>
<td>0.4%</td>
</tr>
<tr>
<td>First Street Foundation</td>
<td>17.5%</td>
</tr>
</tbody>
</table>

Share of properties with hidden flood risk:
- FEMA shows more risk
- No data
National Flood Risk Comparison

Source: New Data Reveals Hidden Flood Risk Across America
Commercial Mortgages’ Flood Exposure

• Eighty percent of the commercial properties damaged in Hurricanes Harvey and Irma lay outside of official FEMA flood zone maps
  → They were likely to have insufficient flood insurance.

• Around two thousand commercial mortgage-backed securities, ~$56+ billion, were exposed to flooding.
  • More than half estimated to lie outside FEMA flood zones.

Sources: Getting physical – Scenario analysis for assessing climate-related risks, BlackRock
Rising Flood Risk: How Much and at What Cost? Morgan Stanley
Flood Risk and Municipal Bond Market

• Higher sea level rise exposure → higher municipal bond spread, especially for longer durations.
  – *Sea Level Rise Exposure and Municipal Bond Yields*

• **Sea levels are rising faster than most pessimistic forecasts**
Flood Risk and Community and Regional Banks

• “Regional and community banks … are more vulnerable to regionally concentrated physical risk, including to sudden extreme events.”

• “These banks’ property loans tend to be more geographically concentrated than the loans of larger banks. In addition, CRE [commercial real estate] loans constitute a much larger share - nearly a third - of the loan books of small banks.”

– U.S. Commodity Futures Trading Commission’s Climate-Related Market Risk Subcommittee of the Market Risk Advisory Committee, Managing climate risk in the U.S. Financial system
Climate Change’s Impact on Agriculture

• Current high value crops in NYS rely on cool temperature.

Potential climate stressors:
- Increased pressure from weeds, insects, and diseases due to warmer winters
- Increased summer heat
- Increased late summer drought
- Change of rain patterns
Climate Change’s Impact on Tourism

Gore Mountain Ski Resort


Algae Bloom in Cayuga Lake

Source: The Ithaca Voice
Financial contagion (market losses, credit tightening) feeding back to the economy

Economy
- Business disruption
- Capital scrapping
- Reconstruction and replacement
- Increase in commodity prices
- Migration

Direct transmission channels
- Lower residential property values
- Lower commercial property values
- Lower household wealth
- Lower corporate profitability and increased litigation

Financial system
- Financial market losses (equities, bonds and commodities)
- Credit market losses (residential and corporate loans)
- Underwriting losses
- Operational risk (including liability risk)

Indirect transmission channels
Wider economic deterioration (lower demand, productivity and output) impacting financial conditions

Source: Guide for Supervisors Integrating climate-related and environmental risks into prudential supervision
Credit Rating Agencies on Physical Risks

• Moody’s
  • Twenty-five sectors representing $8.7 trillion in rated debt have very high or high inherent exposure to climate risk.
  • Eighteen sectors with $7.2 trillion in rated debt have high inherent exposure to physical risk.
  • The largest sectors: emerging market governments, regulated electric and gas utilities, and integrated oil and gas companies.

• S&P
  • Sixty percent of the companies in the S&P 500 (with a market capitalization of $18 trillion) hold assets that are at high risk of at least one type of physical risk.

Sources: Moody's - Thirteen sectors with $3.4 trillion of debt face heightened environmental credit risk
S&P Global - The Big Picture on Climate Risk
Transition Risks

- Drivers of the low carbon transition

  **Policy or regulation change**
  - Paris Agreement commitment
  - A price on carbon emission
  - Phase out of fossil fuel

  **Technology advancement**
  - Lower cost of renewable energy
  - Competitive electric vehicles vs. internal combustion engine vehicles

  **Consumer Preferences**
  - Voluntary purchase of clean energy
Low Carbon Transition is Happening

• Renewables are the cheapest sources of new-build power generation for at least two-thirds of the global population.

• In June 2020, BP wrote off $17.5bn of its oil and gas assets. Shell wrote off $22 bn assets.

• In Feb. 2021, Shell announced it has reached peak carbon emissions and oil production, and laid out a detailed plan for its transition to cleaner energy.

• Gasoline cars phase out
  • Twenty-two countries plan to phase out new internal combustion engine cars between 2027-2040
  • California Executive Order in September 2020 – phase out by 2035
Spill-Over Effect of Low-Carbon Transition

What would happen to the gas stations and convenience stores?

Source: WNYC

Source: electrek
Shale Gas Leasing in Pennsylvania

What would happen to the property value and the leasing revenue?

Source: National Geographic
Transition Risk and Opportunity in Real Estate

• Transition risk
  • NYC buildings – 70% of the city’s carbon emissions.
  • NYC Local Law 97 requires largest buildings to significantly reduce carbon emissions.

• Transition opportunity
  • High energy efficiency $\rightarrow$ low mortgage default rate
Financial contagion (market losses, credit tightening) feeding back to the economy

Economy
- Stranded assets (fossil fuels, real estate, infrastructure, vehicles)
- Reinvestment and replacement
- Increase in energy prices

Direct transmission channels
- Corporate assets devaluation
- Lower corporate profitability and increased litigation
- Lower residential property values
- Lower household wealth

Indirect transmission channels
- Wider economic deterioration (lower demand and output) impacting financial conditions

Financial system
- Financial market losses (equities, bonds and commodities)
- Credit market losses (residential and corporate loans)

Transition risk drivers
- Climate policy
- Technology
- Consumer preferences

Source: Guide for Supervisors Integrating climate-related and environmental risks into prudential supervision
Rating Agencies on Transition Risks

• Moody’s
  • Sixteen sectors with $4.5 trillion in rated debt have very high or high inherent exposure to transition risk
  • Most impacted sectors:
    o Oil and gas
    o Auto manufacturers and suppliers
    o Regulated and unregulated electric utilities
    o Surface transportation & logistics

• S&P
  • Downgraded Exxon, Chevron, Conoco by a notch on climate risks and earnings.
Potential Impact of Transition Risks on Banking

An abrupt transition to a green economy could trigger an increase in banking-system losses of up to 60%.

- Andrea Enria, *ECB Banking Supervision’s approach to climate risks*

“Over half the syndicated lending of major U.S. banks is exposed to climate transition risk.”

- Ceres, *Financing a Net-Zero Economy: Measuring and Addressing Climate Risk for Banks*
Source: Managing climate risk in the U.S. Financial system, CFTC
### Financial Risks from Climate Change are Singular and Unprecedented in Nature

| Scope               | • Global in scale and scope  
|                     | • Cannot be contained regionally or diversified away |
| Size                | • Assets exposed ~ 30% of total financial markets |
| Probability         | • It is happening |
| Duration            | • Decades to Millennia |
| Dependency          | • Future impact heavily determined by actions today |
Climate-Related Business Opportunities

Investment needed globally for net-zero carbon emission by 2050: $1-2 trillion/year

Figure 1: Cumulative green bond issuance by quarter, 2007-3Q 2020

Cumulative issuance ($ billion)

Source: BloombergNEF, Bloomberg L.P.
What are Your Peers Doing?

Lending

- Invest in utility scale solar and other clean energy technologies.
- Finance energy efficiency and climate resilience projects for public agencies.
- Credit unions finance clean energy and energy efficiency projects.

Deposits & Investments

- A corporate sustainable deposit product exceeded $2bn after 1 year of launch.
- Launch impact certified deposits to invest in energy efficiency and clean energy projects.
- Offer fossil fuel free investment products.
What are Your Peers Doing?

**Risk Management**
- Board involvement in climate risk discussions
- Analyze flood risk using new flood map in mortgage underwriting

**Capacity Building**
- Participate in international networks on responsible banking
- Account for carbon emissions that are financed on portfolio.
International Regulators’ Work on Climate

**Network for Greening the Financial System (NGFS)**
- Founded in December 2017
- Currently 83 Members and 13 Observers
  - U.K.
  - France
  - The Netherlands
  - European Central Bank
  - Italy
  - Abu Dhabi
  - China
  - Malaysia
  - Russia
  - West African States
  - Columbia
  - Mexico
  - Chile
  - Australia
  - New Zealand
- DFS – joined in Sep. 2019
- Federal Reserve Board – joined in Dec. 2020
Global Climate-Related Supervision

• Bank of England Supervisory Statement *Enhancing banks' and insurers' approaches to managing the financial risks from climate change* – April 2019

• NGFS *Guide for Supervisors: Integrating climate-related and environmental risks into prudential supervision* – May 2020

• European Central Bank *Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure* – November 2020
DFS’s Climate-Related Actions

• Industry Letter on *Climate Change and Financial Risks*
  o Its purpose
  o Set expectations for all New York banks and non-depository mortgage companies to **start**
    - Integrating **financial risks** from climate change into their **governance**, **risk management**, and **strategies**; and
    - Developing a **disclosure** approach.
  o Institutions should take a **proportionate** approach.

• Coordinating with federal (FRB, NCUA, FHFA, FHLBanks), National Association of State Credit Union Supervisors, and Conference of State Bank Supervisors
Community Reinvestment Act and Climate

- Industry Letter on [CRA Consideration for Activities that Contribute to Climate Mitigation and Adaptation](#)

- Potential eligible tests: community development test, lending test, and innovative investments.

- Example activities:
  - Renewable energy, energy-efficiency, and water conservation equipment
  - Community solar
  - Microgrid or battery storage
  - Flood and stormwater projects
  - Projects to reduce heat risk
U.S. Federal Level Climate Updates

• The White House
  • Rejoined the Paris Climate Agreement - Aim to reduce 26-28% greenhouse gas emission below 2005 levels by 2025;
  • Plan to move the US economy to net zero emissions no later than 2050;
  • Plan to achieve 100 percent clean energy by 2035 and create 10 million new jobs.
The Federal Reserve Board

- Recognized climate change as a financial risk in the *Supervision and Regulation Report* and *Financial Stability Report* – Nov. 2020
- Joined NGFS – Dec. 2020
- Speech by Governor Lael Brainard on *Strengthening the Financial System to Meet the Challenge of Climate Change* – Dec. 2020
- Formed a system-wide Supervision Climate Committee, chaired by Kevin Stiroh – Jan. 2021
- Governor Brainard backs mandatory climate disclosure – Feb. 2021
Department of Treasury

- Treasury secretary’s focus on climate
  - Vowed to create a climate hub during senate hearing
  - “Forcefully addressing the threat of climate change” in calls with international counterparts.

Securities and Exchange Commission

- SEC appointed a Senior Policy Advisor for Climate and ESG
Federal Housing Finance Agency (FHFA)

- Request for information on climate and natural disaster risk management at the regulated entities – January 2021

- Areas for inputs
  - Identifying and assessing climate and natural disaster risk
  - Enhancing FHFA’s supervisory and regulatory framework
Managing Climate Risk vs. Other Risks

• Similar approach as managing other risks
• Does need new expertise but everyone can get started
• DFS’s support and supervision
  • Webinars
  • Roundtables
  • A voluntary and anonymous survey
  • Development of climate-related exam process
Questions?
Feedback?

Contact: climate@dfs.ny.gov