The Fundamentals of Financial Risks from Climate Change
Mortgage Banking Institutions

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February 24, 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 and opportunities.
• Update on federal climate actions
Mortgage Banking Institutions

• Some do not own the mortgage loans and do not have the rights to the underlying collateral.

• Your climate-related risks do not fully overlap with those of end investors of mortgages.
1980–2020 Year-to-Date United States Billion-Dollar Disaster Event Count (CPI-Adjusted)

Source: National Oceanic and Atmospheric Administration
Primary Climate Risk Factors on Financial Markets

<table>
<thead>
<tr>
<th>Physical Risks</th>
<th>Transition Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Direct</td>
<td>- Driven by the transition to a low-carbon economy</td>
</tr>
<tr>
<td>- Flood</td>
<td>- Re-pricing of carbon-intensive financial assets</td>
</tr>
<tr>
<td>- Hurricanes</td>
<td></td>
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<tr>
<td>- Wildfire</td>
<td></td>
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<tr>
<td>- Heat Waves</td>
<td></td>
</tr>
<tr>
<td>- Indirect</td>
<td></td>
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<tr>
<td>- Disruption to supply chains</td>
<td></td>
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July 23, 2020
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>
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<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>
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</tbody>
</table>

Source: Climate Change.com

Source: 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>
National Flood Risk Comparison

Source: New Data Reveals Hidden Flood Risk Across America
Flood’s Impact on Mortgage Servicing

- Flooding
- Increase in non-performing / defaulted loans
- Additional staff and resources to manage the change
- Loss in servicing revenue

July 23, 2020
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 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
Undercharge of Flood Insurance Premium

Kings County – 1,006%
Queens County – 974%
Rockland - 870%
Westchester – 664%

$30b
Annual flood damages, 2050

$18.8b
Annual flood damages, today

$4.2b
Total federal premium coverage, today

Source: Most Americans Don’t Have Enough Flood Insurance for Climate Change
Flood Premium’s Impact on Mortgage Servicing

- Increase in flood premium
- Drop in home price
- Increase in non-performing / defaulted loans
- Additional staff and resources to manage the change
- Loss in servicing revenue
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

 physical risk drivers
- Extreme weather events
- Gradual changes in climate

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.

• 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.

• 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
Transition Risk and Opportunity in Real Estate – change to residential

• 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 → **low mortgage default rate**
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

- Moody’s
  - Sixteen sectors with $4.5 trillion in rated debt have very high or high inherent exposure to transition risk

- 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

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</table>
| **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 is determined by actions today |
Climate-Related Business Opportunities

Figure 1: Cumulative green bond issuance by quarter, 2007-3Q 2020
Cumulative issuance ($ billion)

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

Risk management
• Board and executive management committee’s involvement in climate risk discussions
• Analyze flood risk using new flood map in mortgage underwriting

Lending / Servicing
• Green Mortgages by Fannie, Federal Housing Administration, and Veterans Affairs
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 counterparts, National Association of State Credit Union Supervisors, and Conference of State Bank Supervisors
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.
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
Post webinar survey

- Did the webinar motivate you to start understand the potential financial risks from climate change on your business?
  - Yes
  - No. Please select your barrier(s) in the next question.
- If you answer no in the previous question, what are your barrier(s)? Please check all that apply.
  - Do not have the expertise on climate
  - Have other more pressing and immediate priorities
  - Do not think climate change poses a material risk to my business.
  - Others (please specify below)
- If you choose others in the previous question, please put in your answer here.
  - [space for qualitative answers]
- What areas that you would like to hear more or still have question on?
  - Physical risks and their financial impacts on the residential mortgage space
  - Transition risks and their financial impacts on residential mortgage space
  - Climate-related opportunities
  - DFS’s expectations and timeline
  - Practical tools on how to measure the financial risks from climate change
  - Others (please specify below)
- If you choose others in the previous question, please put in your answer here.
  - [space for qualitative answers]
- What did you think of the length of the presentation?
  - Just right
  - Too long
  - Too short
- What did you think of the depth of the presentation?
  - Just right
  - Too deep
  - Not deep enough
- What did you think of the examples given in the presentation on how climate change impacts the financial system?
  - Just right
  - Too many
  - Too few
- Do you have any other questions or suggestions on how the information was presented to you?
  - [space for qualitative answers]
- Do you have any questions or suggestions on DFS’s climate work in general?
  - [space for qualitative answers]