Modelling Impact of Transition & Physical Risks on a Portfolio of Mortgages

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Energy Ratings – A measure of energy consumption
Lesser Energy Consumed is Better for the Environment

Source: Science Direct

UK Government targets to transition as many homes as possible to energy band C or better by 2035

Source: Bank of England (BoE)
MATLAB Live Editor makes it easy to identify and share the impact of BoE Guidelines on a property/mortgage.
Agenda

- Visualize EPC ratings of buildings in a city & the corresponding Flooding Risk (Physical Risk)
- Understand the impact of policies aimed at increasing the energy efficiency of buildings (Transition Risk)
- Model their impact on a portfolio of Mortgages
Climate Risks

- **Physical Risk**
  - Acute risks such as Flooding, Cyclones
  - Chronic risks such sea level rise, increased temperatures

- **Transition Risk**
  - Financial Risk associated with the transition to climate-friendly options – Getting buildings to have energy rating of C or better
Data for Modelling Physical Climate Risks

- Diverse Sources
  - EPC Ratings
    [Link to EPC Ratings](https://epc.opendatacommunities.org/docs/api/domestic#using_this_api)
  - Flood Risk Data
    [Link to Flood Risk Data](https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/RiskOfFloodingFromRiversAndSea&Mode=spatial)
Climate Risk Modelling

- Challenges
  - Working with Big Data & Diversity of datasets
    - Mapping data such as kml, kmz, etc.
    - Big Data
    - Alternative Data on Cloud
  - Create customized dashboards to share results
  - Availability of tested and reliable Credit Modelling functions
## Accessing Data & Visualizing The Problem/Scale

<table>
<thead>
<tr>
<th>Building_Reference</th>
<th>Building_Type</th>
<th>Address</th>
<th>PostCode</th>
<th>LPC_Rating</th>
<th>Fire_Risk</th>
<th>PropertyValue</th>
<th>CurrentMortgage</th>
<th>CurrentTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>76 ABBEY ROAD, CAMBRIDGE</td>
<td>CB5 8QW</td>
<td>C</td>
<td>Low</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>98 CT ST JAMES'S COURT, CAMBRIDGE</td>
<td>CB5 8QW</td>
<td>B</td>
<td>Medium</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>41 BRIALLANDS CLOSE, CAMBRIDGE</td>
<td>CB5 8QW</td>
<td>A</td>
<td>High</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>23 RIVIERE CLOSE, CAMBRIDGE</td>
<td>CB5 8QW</td>
<td>B</td>
<td>Medium</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>187 KARLTON HOUSE, HOMESTAY (163 CAMBRIDGE)</td>
<td>CB5 8QW</td>
<td>C</td>
<td>Low</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
<tr>
<td>10000134537</td>
<td>Domestic</td>
<td>52 RIVIERE PLACE, RIVIERE</td>
<td>CB5 8QW</td>
<td>C</td>
<td>Low</td>
<td>63,046,841.42</td>
<td>63,10,32,018</td>
<td>77.97%</td>
</tr>
</tbody>
</table>

### Physical Scenarios
- **Road Rise:** Off
- **Filter:** All
- **Retrofit:** None

### Transition Scenarios
- **EPC Rating:** Off
- **Filter:** All
- **Retrofit:** None
Summary

- Challenges
  - Working with Big Data.
  - Create customized dashboards to share results.
  - Availability of reliable & documented credit modelling functions.

- Addressing the challenges using MATLAB
  - Built-in functions to read-in a wide variety of data types and from different data sources
  - MATLAB App designer for quick and interactive dashboard creation.
  - Industry-tested Functionality with Point-and-Click apps and rich documentation.
Further Resources

- Climate Integrated Assessment Models Explorer
- Modelling Climate Risks with MATLAB
- Quick and interactive dashboard creation
- MATLAB Onramp