Nature as a Defense from Disasters: Natural Capital and Municipal Bond Yields

Claudio Rizzi, University of Miami
crizzi@miami.edu

Abstract

I examine the value of climate change mitigation strategies such as nature conservation in municipal bond markets. I find that the market starts to price the value of natural capital after an extreme weather event. Natural capital protection could decrease the county’s cost of debt by as much as $1 million for an average bond. Bonds tied to specific infrastructure projects experience a larger yield increase than general-purpose bonds. The effects of mitigation strategies impact the county with the natural capital and its neighbors. More broadly, I find that natural capital loss is related to population migration and a decrease in personal income, with counties dependent on farming suffering the most. Overall, this paper shows that financial markets price the value of mitigation and highlights the critical role of nature as a shield from natural disasters.

Introduction

Estimating the value of natural capital conservation is essential for assessing the financial impact of local climate-related risks as well as evaluating the trade-offs between nature conservation and economic development. The environmental literature has shown that nature can reduce risks from natural disasters, as well as stimulate biodiversity and collect greenhouse gasses from the atmosphere. Municipal bonds provide an ideal setting for studying this question since investors need to account for local climate-related risks when pricing these assets.

I show that a mitigation premium arises after an extreme weather event hits the counties that experience natural capital loss.

Data

Natural Capital Loss: Protected Areas Downgrading, Downsizing, and Degazettement (PADDD)

- The environmental literature has shown that nature can reduce risks from natural disasters, as well as stimulate biodiversity and collect greenhouse gasses from the atmosphere.

Municipal Bonds: MSRB and Bloomberg

- Municipal bonds provide an ideal setting for studying this question since investors need to account for local climate-related risks when pricing these assets.

Empirical Approach

- Difference-in-difference estimator
  - Extreme weather and natural capital loss events as exogenous shocks
  - Adjusted using De Chaisemartin and D'Haultfoeuille (2020)
- Matching
  - Propensity score
  - Nearest neighbor
  - Same county

Bond Yields around Extreme Weather Event

Bonds issued by counties that lose natural capital display a "mitigation premium", i.e., higher municipal bond yields, compared to similar bonds issued by counties that do not experience natural capital loss. The mitigation effect is only priced after the extreme weather event hits.

The effect of mitigation (or lack thereof) could increase the municipality’s cost of debt by as much as $1 million over the life of a single bond.

Discussion of the Channel

Awards damages (in 10^{-1})

- 

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Post</th>
<th>Treatment × Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.91***</td>
<td>0.71*</td>
<td>2.73***</td>
</tr>
<tr>
<td>0.13***</td>
<td>0.10</td>
<td>0.29***</td>
</tr>
</tbody>
</table>

The results show that natural capital loss affects bonds issued by farming counties more than other counties and impacts other important economic outcomes, such as population migration and personal income.

Conclusion

- The study highlights the impact of nature conservation on financial markets.
- It sheds light on the connection between natural capital loss and climate change risk mitigation.
- It contributes by proposing an alternative way to price the value of natural capital.