Will assets be stranded or bailed out? Expectations of investors in the face of climate policy

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Stranded Assets

- Stranded assets: assets which lose economic value before the end of their economic / technical life
- Assets related to fossil energy may become stranded due to climate policy
  - Fossil resources ("unburnable carbon")
  - Other kinds of assets (infrastructure, cars,...)
  - ... and financial assets linked to these assets (shares, bonds, ...)

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... and financial assets linked to these assets (shares, bonds,...)
If markets still allocate capital to fossils:
  - this allocation today implies a higher cost to achieve climate goals (IPCC 2014)
  - if sudden revaluations of assets and firms occur, this can translate into macroeconomic shocks

Important to understand: what is investors’ perception regarding stranded asset risk? (How) is it priced in?
Research question

- What are investors’ priors regarding stranded asset risk, and
- (how) do these priors change when climate policy proposals are announced?
What we do

- Exploit the evolution of a climate policy proposal in Germany in three stages
- Conduct event study on all three stages (effect of news on asset returns of affected companies)
- The sign pattern of the reactions to these proposals reveals information on investors’ priors and updating behavior
- Investor type we look at: stock market investors (equity)
Policy background: “Klimabeitrag”

- Climate policy proposal for Germany in 2015
- Aim: to reduce CO₂ emissions from German power sector by an additional 22 million tonnes
Stage 1: “Climate levy” proposal - *Uncompensated policy*

- In March 2015, Ministry presents first draft
- Main idea: charge an extra levy on CO$_2$ emissions from power-generating units
  - older than 20 years, and
  - for those emissions that exceed a certain threshold (levy-free allowance)
- Most (or only) affected energy carrier: Lignite
- Proposal would have led to stranding of assets
Stage 2: “Security reserve” proposal - \textit{Compensated policy}

- Idea: turn some share of lignite capacity into security reserve (paid for holding capacity ready)
- July 2, 2015: Coalition summit decides
  - no climate levy
  - security reserve: 2.7 GW will be mothballed and turned into security reserve
Stage 3: State aid assessments - *Challenge to compensation*

- July / August: Report for German Parliament concludes that security reserve may violate EU state aid rules
- September: EU Commission announces to open state aid case
What are investors interested in?

Scenarios for their priors and reactions

<table>
<thead>
<tr>
<th></th>
<th>Stage 1: Uncompensated policy</th>
<th>Stage 2: Compensated policy</th>
<th>Stage 3: Challenge of compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>don't care</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>respond to policies, didn’t price in stranded asset risk before</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>have priced in expected loss, but are surprised by compensation</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>price in loss and expect compensation</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Methodology: Event study

- Underlying assumption: markets price in information as soon as it becomes publicly available (semi-strong form of market efficiency hypothesis)

- Terminology: Returns of asset $i$: $r_{it} = \ln p_{i,t} - \ln p_{i,t-1}$, i.e. daily change in the logarithm of asset prices
Timeline and basic approach

Basic approach:

- Predict “normal” returns of an asset
- Calculate abnormal returns (= prediction error)
- Calculation of cumulative abnormal returns (CARs) over event window
- Formally: Test whether event window dummy is significant
Affected companies

- In 2015, three stock-listed firms active in German electricity production: RWE, E.ON and EnBW
- RWE and E.ON have lignite capacity older than 20 years, EnBW does not
### Results by event type

<table>
<thead>
<tr>
<th>Companies</th>
<th>Climate levy proposal</th>
<th>Security reserve proposal</th>
<th>State aid assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RWE</td>
<td>0.018</td>
<td>0.016</td>
<td>-0.105***</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.019)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>E.ON</td>
<td>0.014</td>
<td>-0.011</td>
<td>-0.074***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.015)</td>
<td>(0.016)</td>
</tr>
</tbody>
</table>

Baseline specification: 5-day event window, 90-days estimation window, error distribution $\epsilon_{it} \sim NID(0, \sigma^2)$; explanatory variable: DAX. The results are robust to changes in all these specifications.

**Table: ACAR by Event Type**
Conclusion

- Investors are concerned about stranded asset risk...
- ...but they also believe in the lobbying power of firms (or other political economy mechanisms which enable compensations)
- Results are robust to controlling for firm-specific and industry-specific shocks
Conclusion

- The analysis is specific to the German context
- But: implications for the design of climate policy
  - Expectations of investors are crucial for a transition to clean capital
  - If compensations are expected, they may be necessary to avoid larger shocks
  - Policymakers and researchers need to better understand the interactions between policymaking and investors’ expectations
Thank you!


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