Climate Change-Related Regulatory Risks and Bank Lending
Isabella Mueller and Eleonora Sfrappini
Halle Institute for Economic Research (IWH) | isabella.mueller@iwh-halle.de

Motivation
- Climate change makes transitioning towards a more sustainable and greener future a first-order challenge
- Transition relies, at least to some degree, on regulatory intervention → Firms face regulatory risks related to climate change
- No complete understanding of how firms’ regulatory risks affect banks’ lending decisions
- Yet, banks’ response is key for transition: setting incentives and providing funding

The set-up in a nutshell

Research question: How does climate change-related regulatory risks affect credit reallocation?
Research design: DiD set-up using the Paris Agreement as a shock that raised banks’ awareness of transition risks (Bolton Kacperczyk, JFE, 2021; Krueger et al., RFS, 2020)
Laboratory: Syndicated loan market between 2009 and 2019
Data feature: Firms’ exposure to climate-change related regulatory risks (constructed by Sautner et al. (2020))

Hypotheses

Negatively exposed firms
H1: Banks lend less due to increased awareness about negative impact of regulatory intervention on firm outcomes
H2: Banks lend more for two potential but contrasting reasons: Cashing off the market or supporting transition of firms that have strategy/potential to adapt business model

Positively exposed firms
H1: Banks lend more due to increased awareness about positive impact of regulatory intervention on firm outcomes
H2: Banks lend less as existing barriers to green finance are still too high

Identification strategy
We employ a DiD to identify how banks adjust credit supply after Paris Agreement while allowing effect to differ w.r.t. firms’ exposure:

\[
y_{ft} = \beta_0 + \beta_1 \text{Post} + \beta_2 \text{NExp} + \beta_3 \text{Post} \times \text{NExp} + \epsilon_{ft}
\]

(1)

- \(y_{ft}\): Log credit between bank b and firm f in quarter t
- Post = 1 from 2015Q4 onwards (= after Paris Agreement)
- Positive = 1 if firm f is positively exposed over pre-shock period, and 0 otherwise
- Negative = 1 if firm f is negatively exposed over pre-shock period, and 0 otherwise
- Extensive FE structure to isolate loan supply: firms’ industry-location-size-time (\(\zeta_{jls,t}\)) (Degryse et al., JFI, 2019); bank-time (\(\zeta_{b,t}\)); bank-firm (\(\zeta_{b,f}\))

→ \(\beta_1\) and \(\beta_2\) capture changes in lending to positively/negatively exp. firms compared to firms with zero exposure

Results:
Regional heterogeneity
Dividing the sample depending on the location of the borrower uncovers different lending volumes across regions:

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive × Post</td>
<td>-0.094*** (0.126)</td>
<td>0.017*** (0.112)</td>
</tr>
<tr>
<td>Negative × Post</td>
<td>-0.017*** (0.060)</td>
<td>0.015*** (0.112)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>USA</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>All FE or</td>
<td>162,394</td>
<td>93,905</td>
<td>162,394</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>Yes</td>
<td>0.890*** (0.906)</td>
<td>0.890*** (0.906)</td>
</tr>
<tr>
<td>Number of banks</td>
<td>164</td>
<td>148</td>
<td>164</td>
</tr>
<tr>
<td>Number of firms</td>
<td>1,637</td>
<td>295</td>
<td>1,637</td>
</tr>
<tr>
<td>Clustering Bank</td>
<td>Bank</td>
<td>Bank</td>
<td>Bank</td>
</tr>
</tbody>
</table>

USA: Banks lend more to negatively exp. firms
Europe: Banks lend more to positively exp. firms
Magnitudes (17.0% and 51.9%) are economically large

Summary

Research question: How does climate change-related regulatory risks affect credit reallocation?
Results: Our findings identify large heterogeneity depending on firms’ regulatory risks, their location, and banks’ indirect exposure to firms’ risks.
Contribution: This work helps understand the impact of banks’ credit reallocation on the transition towards a greener economy.

Identification strategy
We evaluate the role of banks’ own, albeit indirect exposure to firms’ regulatory risks via banks’ loan portfolio.

It might lead banks with a portfolio tilted towards negatively exposed firms to face different incentives when reallocating credit:

H1: These banks, in particular, may diversify their portfolio by lending more (less) to positively (negatively) exposed firms
H2: These banks, in particular, may protect legacy positions by lending more (less) to negatively (positively) exposed firms

Differential role of banks’ exposure
Does banks’ behavior fuel or hinder the transition?
Results leave room for interpretation how banks’ behavior interacts with transition. We provide further evidence by considering:

- The type of firms towards which credit is directed
- The type of banks reallocating credit differently

USA:
- Credit is not directed towards firms that have higher potential to adapt business model
- Banks with high incentive to exploit profit opportunities lend even more to negatively exposed firms

Europe:
- Banks lend more to negatively exposed firms that have higher potential to adapt business model
- Negatively exposed banks lend even more firms that have lower potential to adapt business model

What is driving banks’ behaviour?
Our analysis so far left open what is driving banks’ behavior. We investigate two channels:

Preferences: Is banks’ behavior driven by a shift in their preferences?
Risks: Is banks’ behavior driven by increased awareness about the financial risks associated with regulation related to climate change?

→ The risk channel appears to dominate the preference channel
→ Albeit, the way how this works differs between USA and Europe

* USA: Banks’ exposure does not play a differential role
* Europe: The more negatively exposed a bank is, the more it lends to negatively exposed firms. Banks at the 90th percentile of the distribution lend 42% more towards negatively exposed firms.