

# Climate Change-Related Regulatory Risks and Bank Lending

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## 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 firms' 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)) → allows to identify

- Firms that could be **negatively** impacted by regulatory intervention, e.g., due to increased operating or input costs (*negatively exposed firms*)
- Firms that could **benefit** from regulatory intervention, e.g., due to subsidies (*positively exposed firms*)

## 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: Creaming 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

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

$$y_{b,f,t} = \beta_1 \text{Positive}_f \times \text{Post}_t + \beta_2 \text{Negative}_f \times \text{Post}_t + \zeta_{b,f} + \zeta_{j,l,s,t} + \zeta_{b,t} + \varepsilon_{b,f,t} \quad (1)$$

- $y_{b,f,t}$ : Log credit between bank  $b$  and firm  $f$  in quarter  $t$
- $\text{Post}_t = 1$  from 2015q4 onwards (= after Paris Agreement)
- $\text{Positive}_f = 1$  if firm  $f$  is positively exposed over pre-shock period, and 0 otherwise
- $\text{Negative}_f = 1$  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 ( $\zeta_{j,l,s,t}$ ) (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:

	USA	Europe
Positive × Post	-0.094 (0.126)	0.519*** (0.114)
Negative × Post	0.176*** (0.060)	0.055 (0.112)
Observations	162,394	93,805
All FE	Yes	Yes
Number of banks	96	148
Number of firms	1,637	295
Clustering	Bank	Bank

- **USA:** Banks lend **more** to **negatively exp. firms**
- **Europe:** Banks lend **more** to **positively exp. firms**
- Magnitudes (**17.6%** and **51.9%**) are economically large

## Differential role of banks' exposure

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

	USA	Europe
Positive × Post	-0.111 (0.134)	0.507*** (0.113)
Positive × Post × NegBank	119.980 (108.050)	10.244 (18.535)
Negative × Post	0.176*** (0.060)	0.029 (0.106)
Negative × Post × NegBank	-3.912 (9.188)	25.324*** (9.639)
Observations	162,394	93,805
All FE	Yes	Yes
Adjusted $R^2$	0.890	0.906
Number of banks	96	148
Number of firms	1,637	295
Clustering	Bank	Bank

- **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 toward negatively exposed firms.

## 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

→ **Credit reallocation seems to hinder transition**

### 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

→ **Credit reallocation seems to facilitate transition but banks' exposure is an obstructing factor**

## 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**