“There is No Planet B”, But for Banks “There are Countries B to Z”: Domestic Climate Policy and Cross-Border Lending

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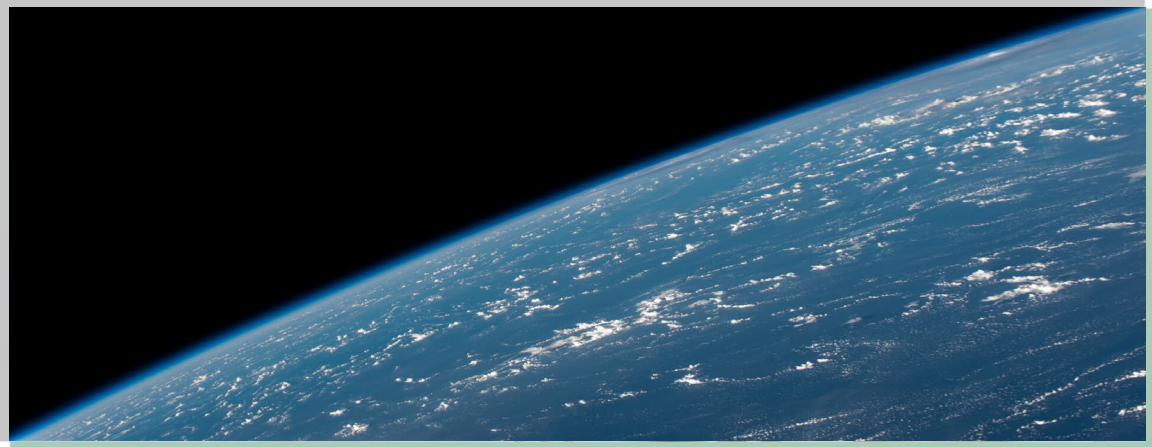

Climate change: A global challenge

- Climate change is a challenge that requires global coordination and cooperation
  - 2021 U.S. Presidential Executive Order on *Tackling the Climate Crisis at Home and Abroad*

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JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

Executive Order on Tackling the Climate Crisis at Home and Abroad

The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents. Domestic action must go hand in hand with United States international leadership, aimed at significantly enhancing global action. Together, we must listen to science and meet the moment.

But de-globalization and fraying cooperation raise worries?

- Raghuram Rajan's Per Jacobsson lecture: *Why Continued Globalization Offers us the Best Chance of Addressing Climate Change*

  IMF/World Bank Annual Meetings October 15, 2022

- "ESG Watch: Is it curtains for Mark Carney's green alliance, or just teething problems?"
  - Glasgow Financial Alliance for Net Zero (GFANZ) group
  - Climate pledges have become increasingly contentious

  Reuters April 26, 2023

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There is a significant heterogeneity across countries regarding climate policy stringency…

Climate policy is crucial: Active climate protection and regulation by governments to mitigate and adapt to climate change

IMF, 2019

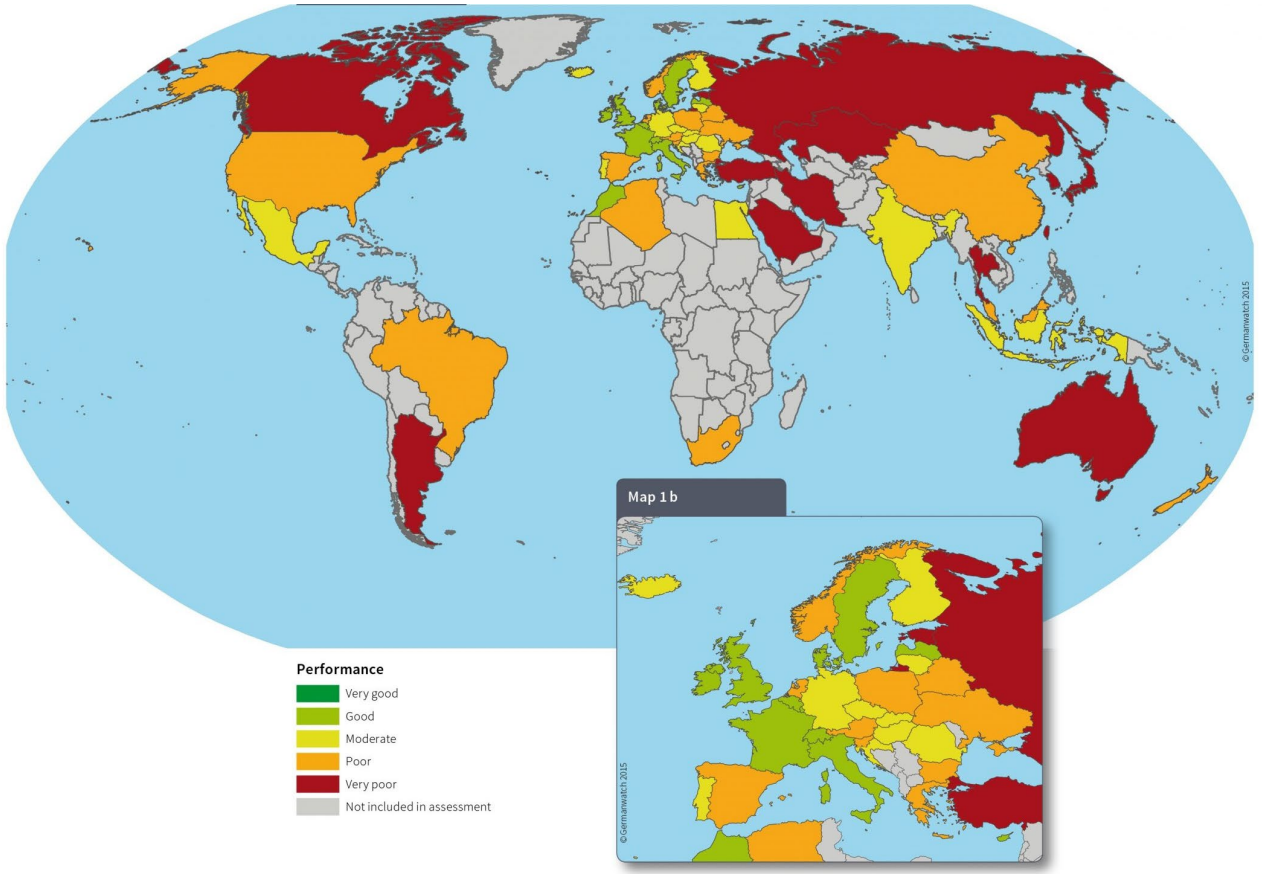

Figure: *The Climate Change Performance Index 2016: Results*

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Climate policy: A global challenge

- In the **domestic market**, stringent climate policy may
  - Increase the demand for funds for innovation and green technologies
    → Bank lending not well-suited to finance (green) innovation

    Minetti, RF 2011; De Haas and Popov, EJ 2023; Degryse, Roukny, and Tielens, 2023
  - Require a change in firms' business model or production process
    → Might decrease firms' profitability
    → Domestic lending less appealing?

Do banks react to the heterogeneity in national climate policy?

What does this heterogeneity mean for cross-border lending?

Overview of paper: : Do banks refocus cross-border lending from “green” to “brown” firms and countries?

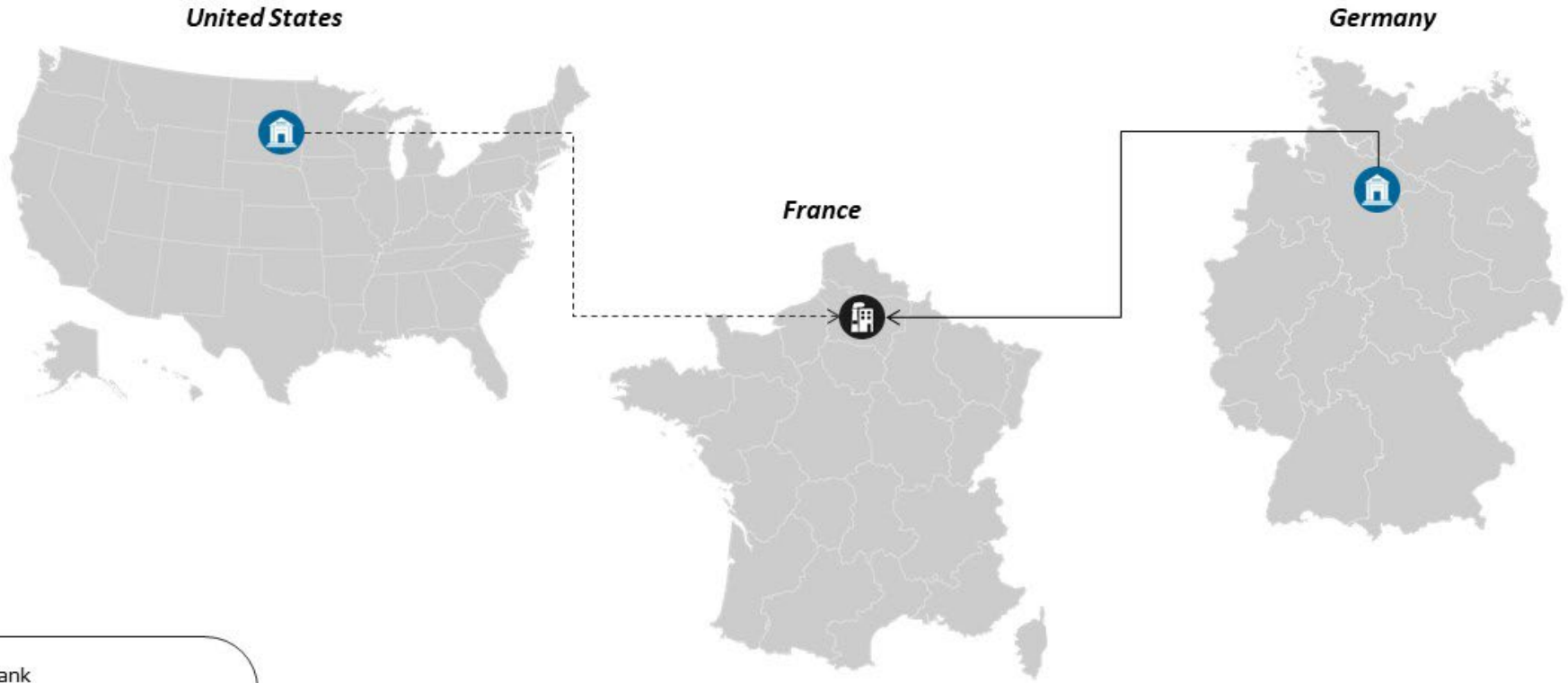
- Evidence that banks exploit the lack of global coordination in climate policies by increasing cross-border lending to ``brown´´ firms in ``brown´´ countries

- Exploit the Climate Change Performance Index (CCPI) as a global measure of climate policy stringency to estimate effects of cross-border bank lending in the syndicated loan market

  → Isolate credit supply by using **loan fixed effects**

  → Use **change in the green party share** in the parliament as **instrument** to estimate causal effects of domestic climate policy stringency

Main results



Bank

Firm

Differential CCPI Germany-US = 6 index points in year 2015

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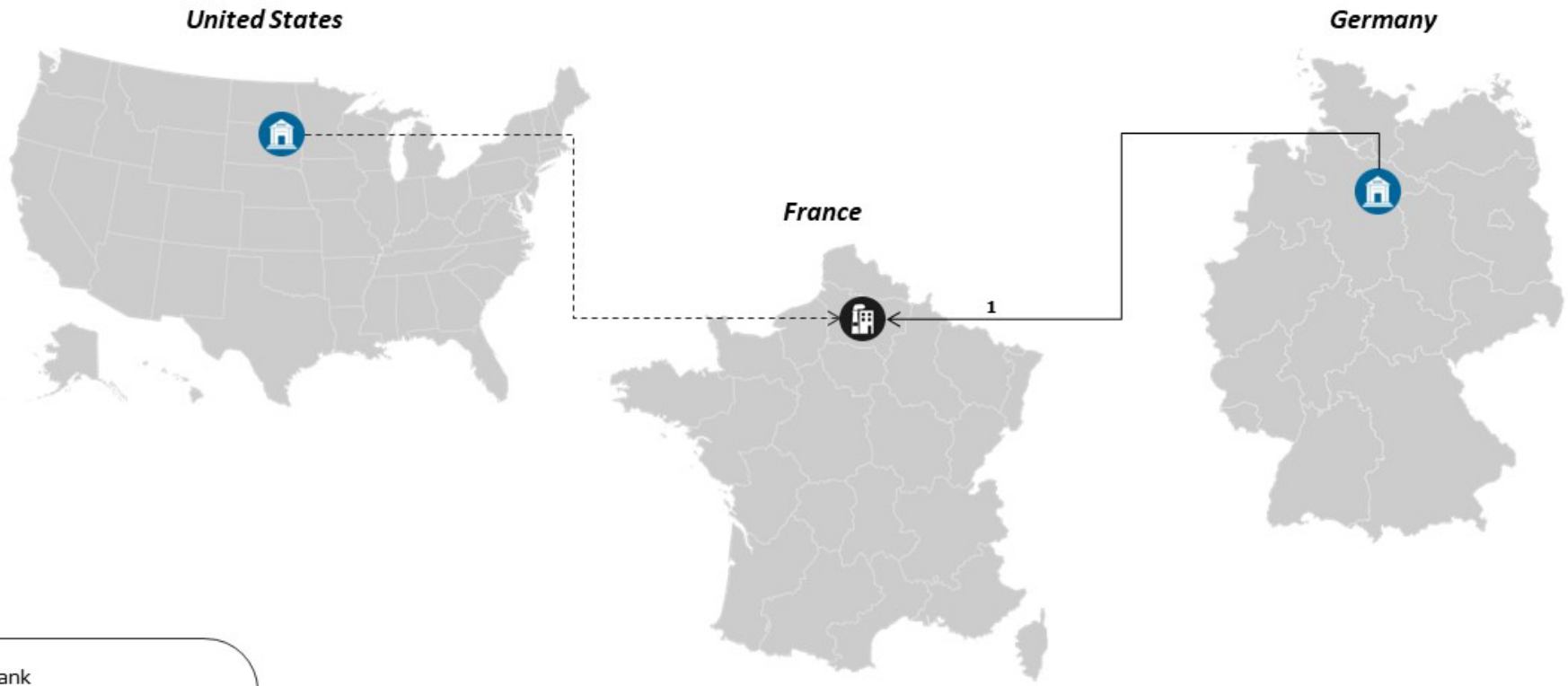
Main results



Bank

Firm

Differential CCPI Germany-US = 6 index points in year 2015

1. Increase in cross-border loan share by 0.5 p.p. (mean loan share = 7.72 percent, 6 percent relative to the mean)

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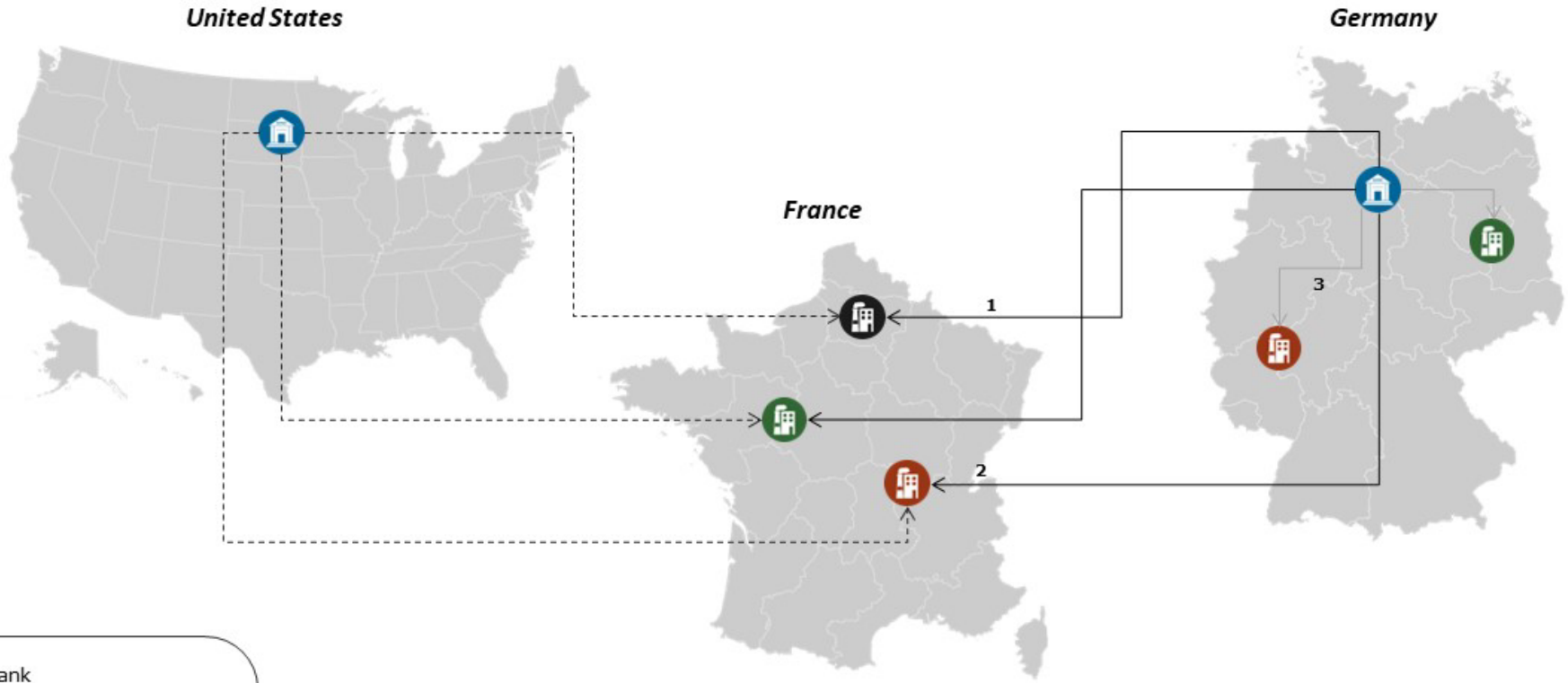
Main results



Differential CCPI Germany-US = 6 index points in year 2015

1. Increase in cross-border loan share by 0.6 p.p. (mean loan share = 7.72 percent, 6 percent relative to the mean)
2. Increase in cross-border loan share by 5.5%
3. Decrease in domestic loan share by 15%

Our contribution

- Cross-border lending as a tool to protect loan portfolios exposure to transition risks (risks created by the policies implemented for the fight against climate change)

  Krueger, Sautner, and Starks, RFS 2020; Seltzer, Starks, and Zhu, 2020, Stroebel and Wurgler, 2021

  → Empirical evidence shows that firms reallocate their activity to areas with less stringent policy

  Bartram, Hou, Kim, JFE 2021; Ben-David, Jang, Kleimeier, and Viehs, EP 2021

- Role of banks in promoting sustainable (green) economy and the allocation of the funding. Literature has focused on loan terms and bank- vs bond- financing

  Beyene, De Greiff, Delis, and Ongena, 2022, De Haas and Popov, 2021, Bolton and Kacperczyk, 2021, Delis, De Greiff, Iosifidi and Ongena, FMII 2023, Laeven and Popov, 2021, Mueller and Sfrappini, 2021, Ivanov, Kruttli, Watugala, 2021

- Climate policy stringency as an incentive for cross-border lending. Literature has focused on geographical and cultural proximity, regulatory arbitrage opportunities

  Mian, JF 2006, Lin, Ma, Malatesta, and Xuan JFE 2012, Karolyi and Taboada, JF 2015, Houston, Lin, and Ma, JF 2012, Ongena, Popov, and Udell, JFE 2013, Demyanyk and Loutskina, JFE 2016, Beck, Buston, and Wagner 2022

Data and identification

Data: Climate policy stringency

- **Challenge**: It is not easy to measure country-level climate policy stringency
  - → Stringency is a combination of many aspects (energy consumption, emissions, regulation, ect.)
  - → Countries may have different measures

- We measure climate policy stringency using the Climate Change Performance Index (CCPI)
  - → Country-year climate policy index developed by Germanwatch (non-proft, independent, environmental organization)

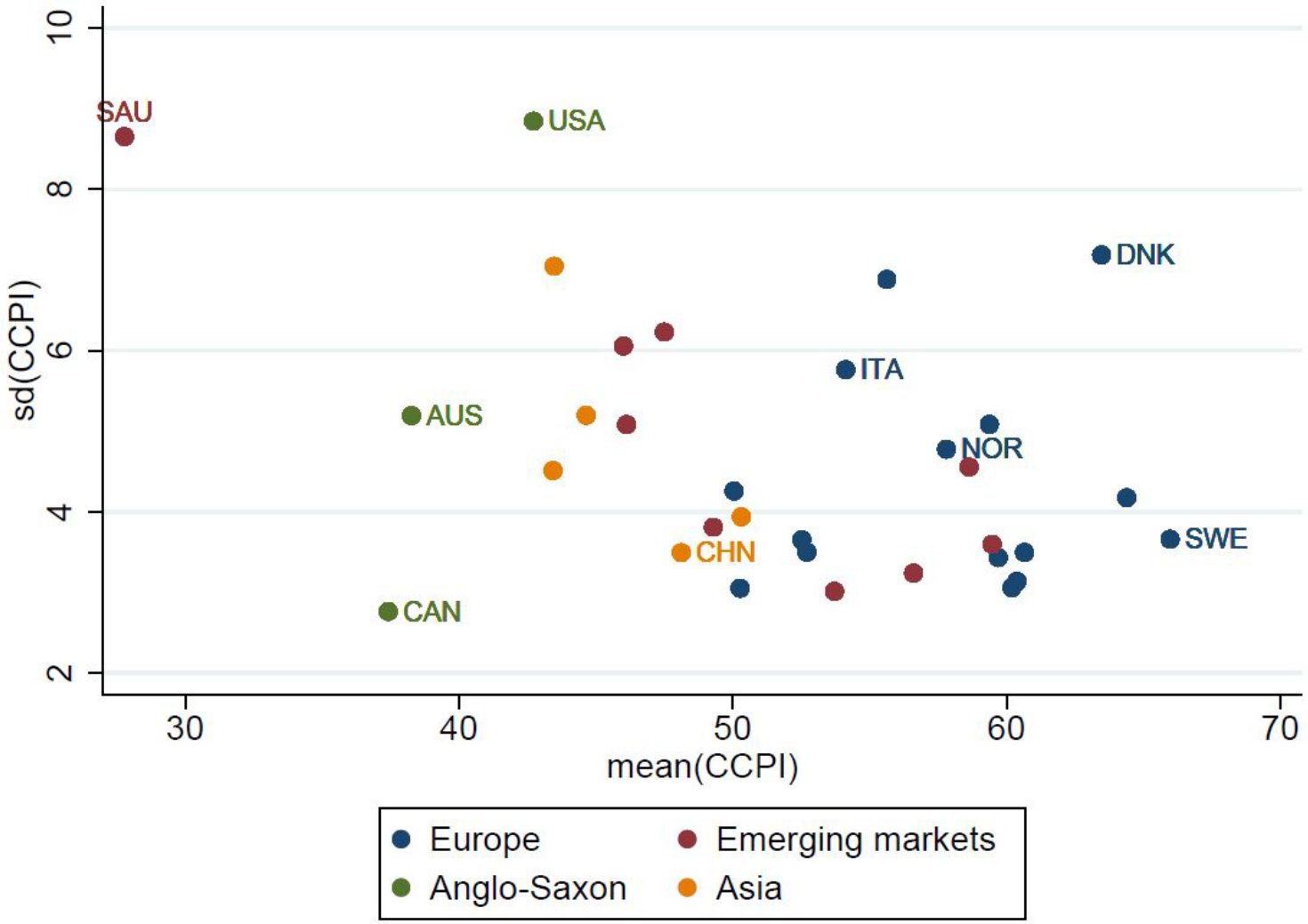
    Burck, Hermwille, and Bals, 2016
  - → It covers 57 countries
  - → Four main categories: Greenhouse gas emissions (60%), Renewable Energy (10%), Energy Efficiency (10%), and Climate Policy (20%)

Climate Change Performance Index: Advantages

- Why an index?
  1. It is a transparent measure; not conditional to subjective choices (when constructing a measure, for example)
  2. There are many different climate policies across countries. An index makes global comparison possible and easy

- Why the CCPI?
  1. It covers 90 percent of global GHG emissions
  2. Presented at the UN's annual climate change policy conference; used by policy institutions (e.g. World Bank, Financial Stability Board) and financial industry (e.g. Black Rock, NN Investment)
  3. *Unique* section on the national and international climate policy of a country Burck, Hermwille, and Bals, 2016
  4. It is a comprehensive measure of a country's climate policy
     - Singular climate policy instruments (carbon taxes, government expenditure on environmental protection, reduction in fossil fuel subsidies) not comprehensive and clean enough

Variation in the climate policy stringency



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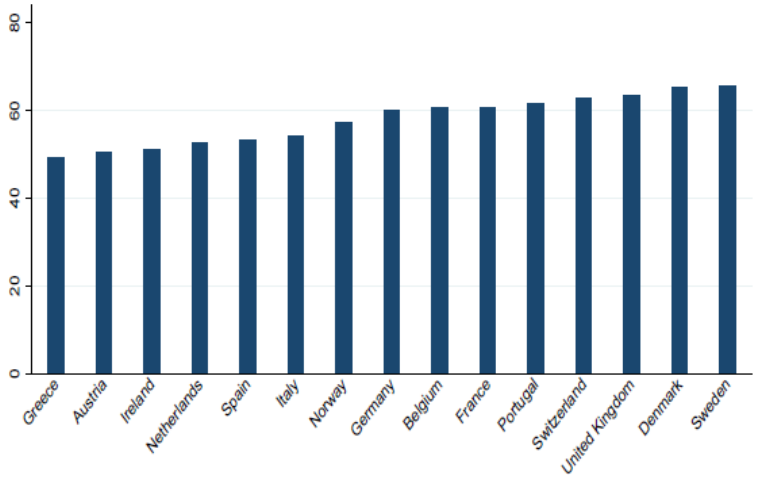
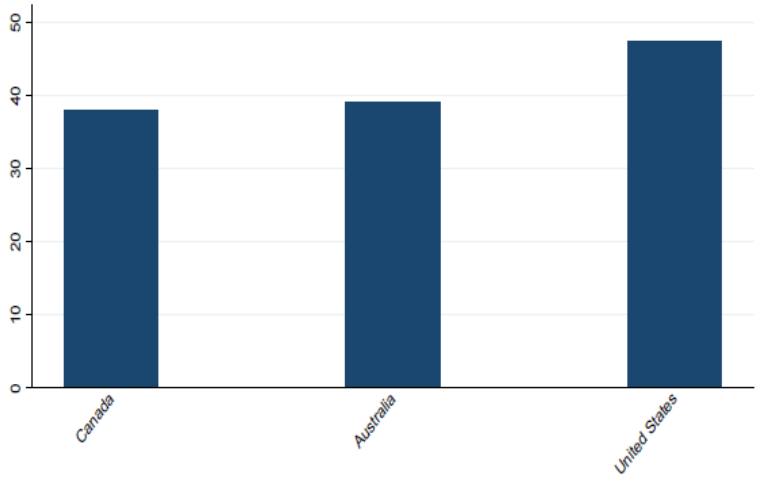
Average home country climate policy stringency

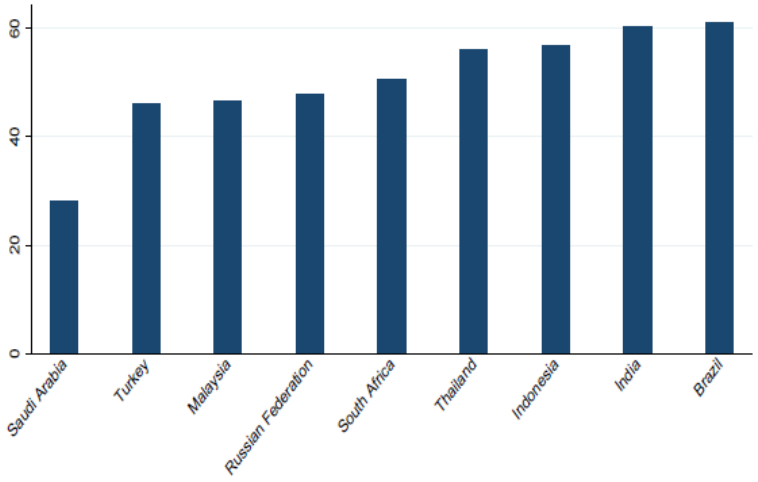
(a) Europe



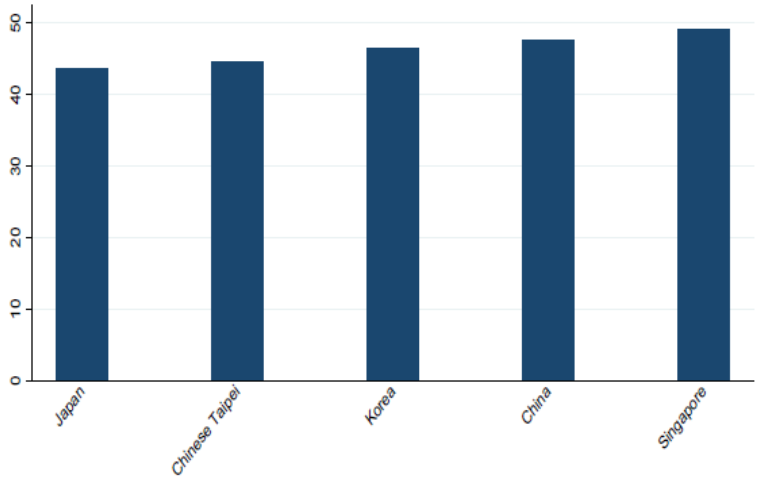
(b) Anglo-Saxon



(c) Emerging markets



(d) Asia



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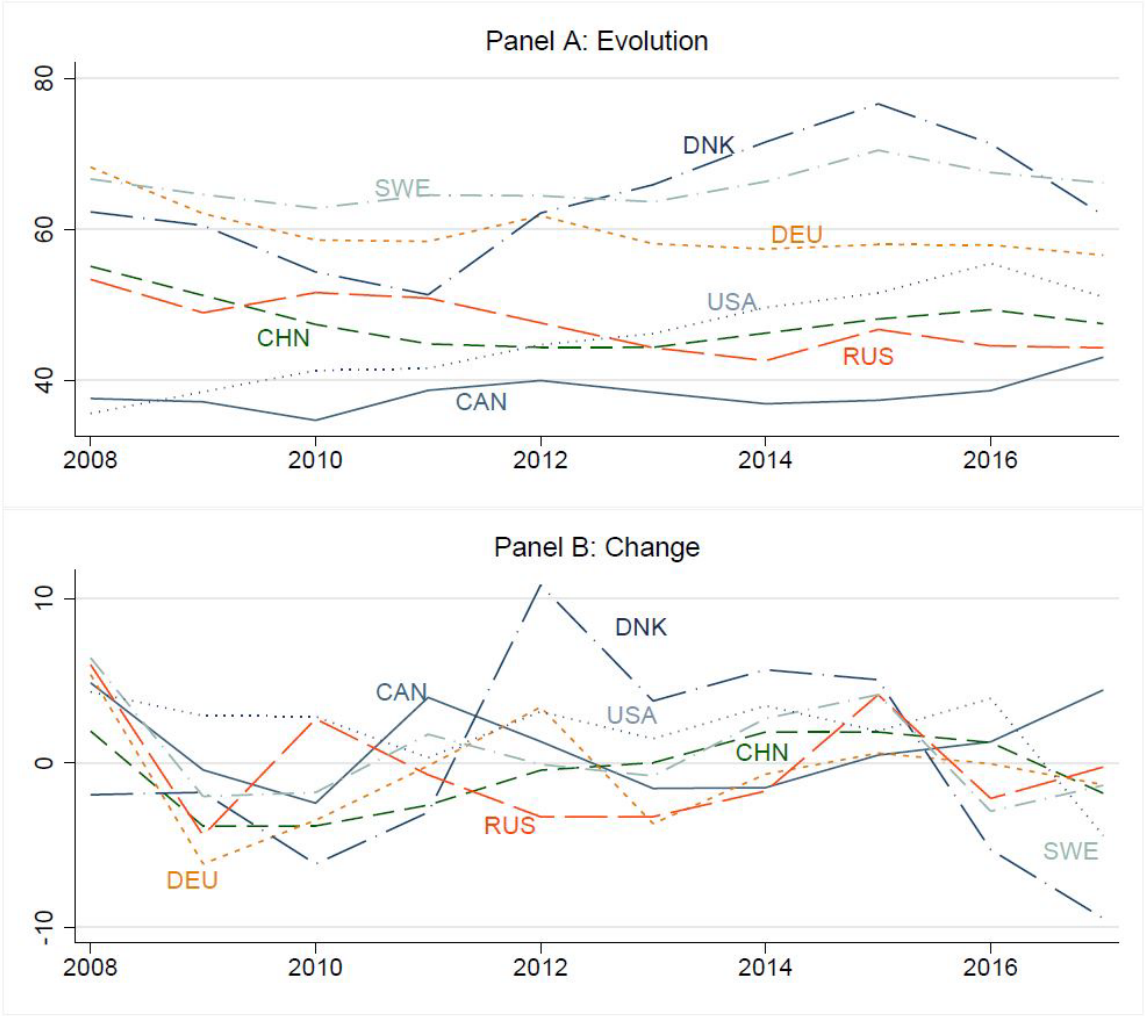
Climate Change Performance Index: Evolution and change overtime



Panel A: Evolution of the CCPI overtime

Panel B: Annual change (%) in the CCPI

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Data: Cross-border lending

- We use syndicated loans to measure cross-border lending (source: DealScan)
  - → A group of lenders come together (syndicate) and provide funds to a single borrower
  - → Lead arranger is the one who carries the process with the borrower (monitoring, collecting payments)
  - → Other lenders are called participants (limited interaction with the borrower, if any)

- Sample: Only (observable) cross-border loan shares
  - → Loans provided by a bank to a borrower with different nationality

De Haas and Van Horen, RFS 2013

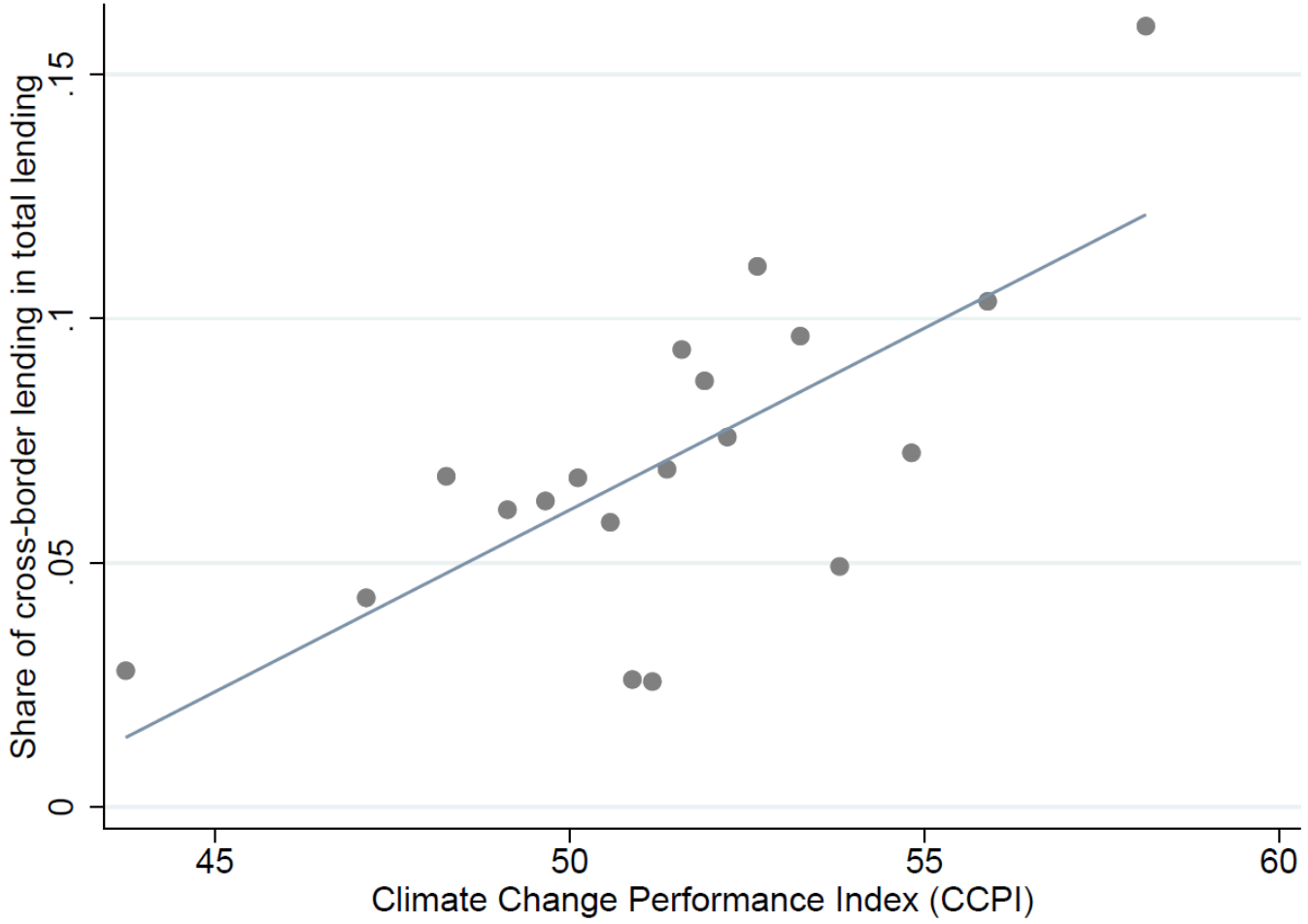
  - → Firm's location: Headquarter country
  - → Bank's location: Country of subsidiary bank (even possible bank group times time fixed effects)
  - → Period: 2007-2017
  - → Hand-match loan shares to bank balance sheet data (Bankscope)

Data: Additional

- We collect national-level election outcomes to construct our IV (source: National Archives Election results)
  - → Collect data on the total number of seats won by a given political party during the election year
  - → European countries only
  - → Total number of seats assigned to the national green party in the Parliament

- We gather firm's carbon intensity (source: Sustainalytics)
  - → Definition: The degree to which a company is exposed to unmanaged carbon risk based on its carbon emissions
  - → Period: 2013-2017
  - → 72.5 percent of the sample firms are at high carbon intensity risk (polluting firms)

Correlation between home country climate policy and cross-border lending



A strong and positive correlation between CCPI and banks' cross-border lending activity

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Threats to the identification?

- **Loan demand**
  - → A change in a country's climate policy stringency can alter the loan demand of firms from abroad
  - → For example: A firm can deem the country-level climate policy stringency as an indicator for the lending practices of banks from that country

- **Omitted variables** correlated with climate policy stringency and cross-border lending
  - → Economic conditions, demographics, institutions, etc..
  - → For example: A change in a country's macroeconomic conditions can influence both the climate policy stringency and cross-border lending

$$\text{Lender Share}_{b,l,f,t} = \alpha_l + \beta \text{CCPI}_{c,t} + \gamma \mathbf{X}_{b,t-1} + \varepsilon_{b,l,f,t}$$

- We compare lenders within the same loan saturating the model with loan fixed effects

- We control for variables (culture, distance, quality of institutions, bank regulation, bank competition, economic, and demographic conditions) that are associated with cross-border lending

  Qian and Strahan, JF 2007; Mian, JF 2008; Houston, Lin, and Ma, JF 2012; Ongena, Popov, and Udell, JFE 2013; Karolyi and Taboada, JF 2015

- Green Party share in the parliaments as an IV for climate policy stringency
  - → **Relevance condition:** Higher Green Party share can predict stringent policies, thanks to party's mandate
  - → **Exclusion restriction:** To the extent that election cycles are orthogonal to economic cycles, IV can satisfy this assumption

Results

The effect of home country climate policy stringency on cross-border lending

	Lender Share						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$CCPI_{lender}$	0.027	0.043***	0.044***	0.045***	0.042***	0.042***	0.081***
	(0.019)	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.016)
Controls & Fixed Effects:							
Bank Group Controls	✓	✓	✓	✓	✓	✓	
Borrower FE		✓	✓				
Year FE			✓				
Borrower × Year FE				✓			
Loan FE					✓	✓	✓
Bank Group FE						✓	
Bank Group × Year FE							✓
Obs.	12,478	12,478	12,478	12,478	12,478	12,394	12,105
R^2	0.004	0.735	0.736	0.809	0.842	0.863	0.878
Mean(Lender Share)	7.722						

Column (5) saturated with loan fixed effects

Standard errors clustered at the lender's country-year level

Bank-group level controls: Net interest margin, Tier 1 capital ratio, log(Tot assets), log(Customer deposits), liquidity ratio

German bank has 0.5pp or 6% on average higher loan share than an American bank in the same loan (+6 index points)

Mitigating concerns about omitted variables

This table reports estimates from Equation 1 but adding additional controls. The dependent variable is Lender share and the main independent variable is $CCPI_{lender}$. The sample covers the period 2007-2017. Economic controls are log(GDP per capita), domestic credit to GDP, unemployment rate, GDP growth. Culture controls are log(Distance) and common language. Domestic bank competition control is Top 5 bank concentration. Demographics controls are log(total population), young workforce, old workforce, and population growth. Bank regulation controls are independence of supervisory authority and capital regulatory index (Barth et al., 2013). Institution controls are legal rights index, financial freedom, property rights, and log(Contract enforcing days). Control variables and fixed effects are indicated at the bottom of each column. All regressions include bank group level controls (net interest margin, Tier 1 capital ratio, log(total assets), log(customer deposits), and liquidity ratio). Standard errors are clustered at the lender's country-year level and shown in parentheses. For variable definitions, see Table A4. *** p<0.01, ** p<0.05, * p<0.1.

	Lender Share					
	(1)	(2)	(3)	(4)	(5)	(6)
$CCPI_{lender}$	0.039***	0.034***	0.032***	0.037***	0.045**	0.058*
	(0.008)	(0.008)	(0.008)	(0.009)	(0.019)	(0.033)
Controls & Fixed Effects:						
Loan FE	✓	✓	✓	✓	✓	✓
Bank Group Controls	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓
Culture Controls		✓	✓	✓	✓	✓
Bank Competition Controls			✓	✓	✓	✓
Demography Controls				✓	✓	✓
Bank Regulation Controls					✓	✓
Institutions Controls						✓
Obs.	11,530	11,076	11,076	11,076	5,810	3,571
R^2	0.853	0.854	0.854	0.854	0.865	0.872
Mean(Lender Share)	7.722					

Standard errors clustered at the lender's country-year level

In all of these specifications, the positive coefficient of CCPI survives, and its magnitude is similar to the ones in the main table

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Green Party share as an instrument for climate policy stringency

	$CCPI_{lender}$	Lender Share		
	(1)	(2)	(3)	(4)
Δ Green Party Share	1.620***			
	(0.277)			
$\widehat{CCPI}_{lender}$		0.120***	0.122***	0.121**
		(0.032)	(0.031)	(0.051)
Controls & Fixed Effects:				
Country Controls			✓	✓
Bank Group Controls				✓
Loan FE	✓	✓	✓	✓
Obs.	3,216	3,216	3,084	3,084
R^2	0.340	0.026	0.033	0.063
1^{st} Stage Eff. F-stat	34.252	34.252	35.612	24.050
Mean(Lender Share)	7.716			

Banks increase their cross-border lending as a reaction to stringent home-country climate policy

The sample covers: Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1st Stage Efficient F-statistics by Olea and Plueger, JBES 2013: larger than the threshold level of 23.1 for 10 percent worst-case benchmark.

IV = the change in Green party share of won seats in two subsequent election years (period 2007-2017)

Exclusion restriction: Is Green Party share correlated with economic conditions?

Panel A

	(1) $\log(GDP)_{pc}$	(2) $\Delta \log(GDP)$	(3) Credit to GDP	(4) Unemp. Rate
	(1)	(2)	(3)	(4)
Δ Green Party Share$_{t-1}$	0.014	0.168	-1.507	0.147
	(0.024)	(0.294)	(2.876)	(0.378)
Obs.	1,602	1,602	1,600	1,602
R^2	0.021	0.019	0.008	0.011

Panel B

	(1)	(2)	(3)	(4)	(5)
	Δ Green Party Share				
	(1)	(2)	(3)	(4)	(5)
$\log(GDP)_{pc,\,t-1}$	0.696				0.902
	(1.026)				(0.731)
$\Delta \log(GDP)_{t-1}$		-0.225			-0.255
		(0.145)			(0.158)
Credit to GDP$_{t-1}$			0.002		0.006
			(0.005)		(0.006)
Unemp. Rate$_{t-1}$				-0.021	0.011
				(0.177)	(0.184)
Obs.	1,622	1,622	1,622	1,625	1,621
R^2	0.008	0.093	0.002	0.001	0.123

The most likely way the exclusion restriction is to be violated is that the Green Party share is correlated with economic conditions

We regress the change in Green Party share on macroeconomic variables and vice versa

In line with the exclusion restriction, the economic condition variables have insignificant coefficients in all of these models

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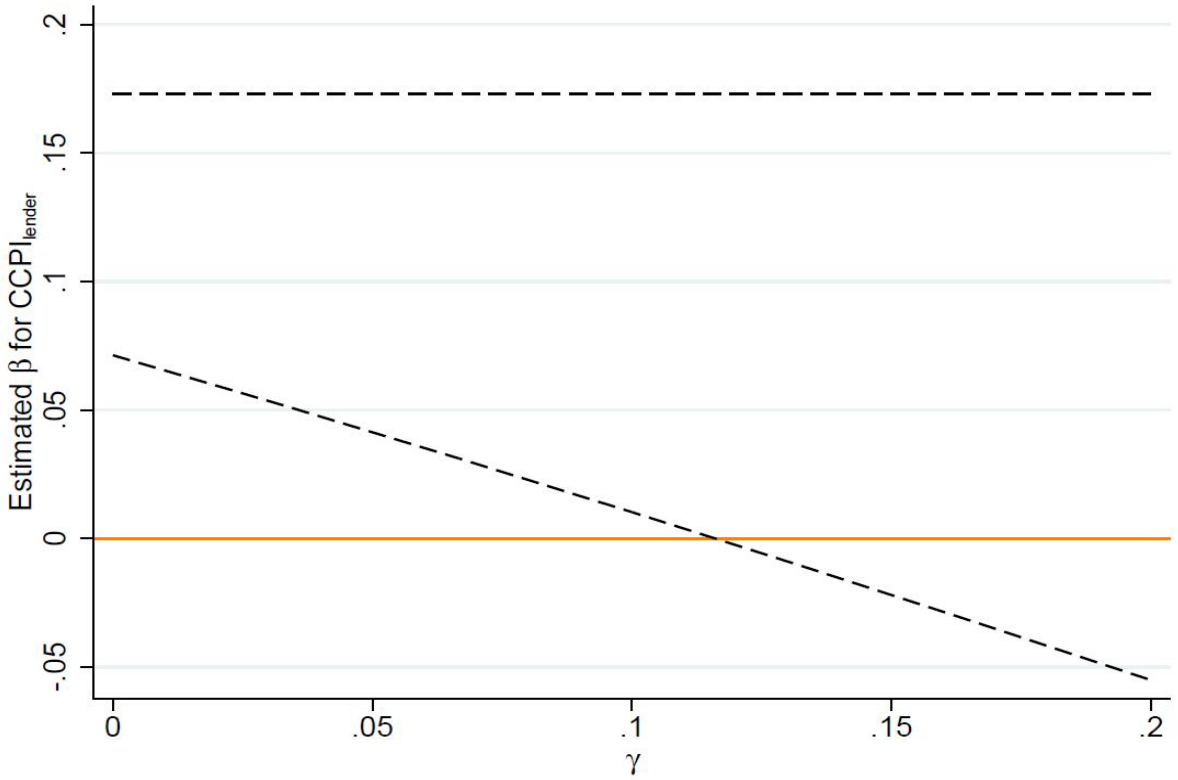
Relaxing the exclusion restriction assumption

$$\textit{Lender share} = \beta\ \textit{CCPI} + \gamma\ \Delta\ \textit{Green Party Share} + \varepsilon$$



Conley, Hansen, and Rossi (REStat 2012) relax the exclusion restriction and provide confidence intervals for the instrumented variable → interval estimates for β when γ deviates from being exactly zero

How much the exclusion restriction is violated to make the effect through CCPI insignificant? Larger than the effect through CCPI→ Not likely, thanks to the lack of correlation between GPS and economic conditions.

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Alternative instrument: Neighboring countries' climate policy stringency

	$CCPI_{lender}$	Lender Share		
	(1)	(2)	(3)	(4)
Neighbor $CCPI_{lender}$	0.808***			
	(0.078)			
$\widehat{CCPI}_{lender}$		0.048***	0.031+	0.035**
		(0.012)	(0.019)	(0.016)
Controls & Fixed Effects:				
Country Controls			✓	✓
Bank Controls				✓
Loan FE	✓	✓	✓	✓
Obs.	11,070	11,070	10,729	10,729
R^2	0.280	0.010	0.016	0.026
1^{st} Stage Eff. F-stat	105.900	105.900	51.412	56.716
Mean(Lender Share)	7.716			

As a robustness, we construct an alternative IV: Leave-one-out IV (Angrist, Imbens, Krueger, JAE 1999) or the average value of neighbors' CCPI

Assumption: CCPI of neighbors predicts the climate policy stringency of a given country

Our causal evidence of stringent climate policy affecting cross-border lending is robust to an alternative IV

Mechanism

Underlying mechanism

Results show that a more stringent climate policy leads to an increase in cross-border lending

- Remaining question: What is the economic mechanism at a play?

- Our conjecture: *Race-to-the-bottom*
  - Regulatory heterogeneity among countries' climate policy can be viewed as a form of regulatory arbitrage
  - Banks can circumvent climate policies by using cross-border lending (international banking)
  - Banks may want to increase their cross-border lending to protect their loan portfolio from the risks entailed by strict domestic climate policy, leading to a *race-to-the-bottom* behavior

Race-to-the-bottom: Cross-border lending as a regulatory arbitrage tool

Lender Share	Interaction		$CCPI_{borrower} < CCPI_{lender}$			
	(1)	(2)	(3) Yes	(4) No	(5) Yes	(6) No
$CCPI_{lender}$	0.046***	0.043***	0.061***	0.008	0.060***	0.009
	(0.008)	(0.008)	(0.015)	(0.016)	(0.016)	(0.017)
$CCPI_{lender} \times CCPI_{borrower}$	-0.002**	-0.002***				
	(0.001)	(0.001)				
Controls & Fixed Effects:						
Bank Group Controls	✓	✓	✓	✓	✓	✓
Borrower × Year FE	✓		✓	✓		
Loan FE		✓			✓	✓
Obs.	12,478	12,478	7,980	3,860	7,763	3,519
R^2	0.809	0.842	0.812	0.819	0.851	0.841
Mean(Lender Share)	7.722					
Difference			0.052**		0.052**	

Effect decreases in borrower's stringency and
it is absent if CCPI(borrower) > CCPI(lender)

Race-to-the-bottom: Does a higher CCPI change the supply of credit domestically?

Lender Share	Carbon-intensive firms				
	(1)	(2)	(3)	(4)	(5)
Same Country × High Carbon Intensity Risk × $CCPI_{lender}$	-0.317**	-0.353***	-0.344***	-0.234**	-0.234**
	(0.125)	(0.110)	(0.111)	(0.097)	(0.096)
Same Country × High Carbon Intensity Risk	19.355***	19.198***	18.794***	11.999**	11.733**
	(7.041)	(6.585)	(6.619)	(5.664)	(5.672)
High Carbon Intensity Risk × $CCPI_{lender}$	0.085	0.070	0.077	0.104**	0.083*
	(0.085)	(0.068)	(0.065)	(0.044)	(0.043)
Same Country × $CCPI_{lender}$	0.066	0.086	0.079	0.011	0.023
	(0.101)	(0.125)	(0.126)	(0.099)	(0.107)
Same Country	-1.752	-2.171	-1.784	2.550	1.799
	(5.998)	(7.491)	(7.539)	(5.939)	(6.354)
High Carbon Intensity Risk	-4.178	-0.698	-1.201		
	(5.066)	(4.887)	(4.680)		
$CCPI_{lender}$	-0.022	0.012	0.002	-0.023	-0.021
	(0.067)	(0.069)	(0.067)	(0.045)	(0.044)
Controls & Fixed Effects:					
Bank Group Controls	✓	✓	✓	✓	✓
Borrower FE		✓	✓		
Year FE			✓		
Borrower × Year FE				✓	
Loan FE					✓
Obs.	2,540	2,540	2,540	2,540	2,540
R^2	0.073	0.540	0.543	0.612	0.701
Mean(Lender Share)	9.008				

Climate policy stringency decreases loan supply to domestic borrowers with high carbon risk while increasing loan supply if such borrowers are abroad

High Carbon Intensity Risk: Dummy variable if a firm is exposed to unmanaged carbon risk based on emissions level

Same Country: Dummy variable if the loan is domestic

Column (5) for 6 index points change:

→ Decrease in domestic loan share by 15%

→ Increase in cross-border loan share by 5.5%

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Race-to-the-bottom: How does domestic bank regulation influence climate policy-induced cross-border lending?

Panel A

Lender Share	Ind. of Bank Supervisory Auth.		
	(1) Low	(2) Medium	(3) High
$CCPI_{lender}$	0.071***	0.028	-0.001
	(0.024)	(0.018)	(0.022)
Controls & Fixed Effects:			
Bank Group Controls	✓	✓	✓
Loan FE	✓	✓	✓
Obs.	2,353	2,693	2,826
R^2	0.827	0.867	0.867
Mean(Lender Share)	7.722		

Panel B

Lender Share	Bank Supervisory Power		
	(1) Low	(2) Medium	(3) High
$CCPI_{lender}$	0.071***	0.043	0.027**
	(0.021)	(0.069)	(0.011)
Controls & Fixed Effects:			
Bank Group Controls	✓	✓	✓
Loan FE	✓	✓	✓
Obs.	2,963	2,181	3,420
R^2	0.874	0.841	0.849
Mean(Lender Share)	7.722		

In a country with strong bank supervision, banks may be less willing to create the shortcut through cross-border lending

A weak supervision environment can facilitate a race-to-the-bottom behavior by banks

The effect of the climate policy stringency on cross-border lending should be larger in countries with weak bank supervision

Race-to-the-bottom: Role of bank reputation

Lender Share	Language		Distance		Border	
	(1) Diff.	(2) Same	(3) High	(4) Low	(5) No	(6) Yes
$CCPI_{lender}$	0.031***	0.019	0.073***	0.001	0.052***	0.010
	(0.008)	(0.014)	(0.011)	(0.011)	(0.009)	(0.047)
Controls & Fixed Effects:						
Bank Group Controls	✓	✓	✓	✓	✓	✓
Loan FE	✓	✓	✓	✓	✓	✓
Obs.	8,156	1,904	6,152	4,952	10,928	972
R^2	0.867	0.842	0.818	0.880	0.838	0.938
Mean(Lender Share)	7.722					
Difference	-0.031*		0.048***		-0.055***	

We proxy for banks' reputation using:

1. The language shared with borrowers
2. The distance between the bank and the borrower countries (above median distance)
3. Whether the bank and borrower countries share border

The effect is stronger when the bank reputation is less likely to be affected
→ in line with a *race-to-the-bottom* behavior

Race-to-the-bottom: Climate policy stringency and cross-border lending specialization

	Specialized Loan			Lender Share		
	(1)	(2)	(3)	(4)	(5)	(6)
$CCPI_{lender}$	0.007***	0.006***	0.006***	0.044***	0.030***	0.029***
	(0.002)	(0.002)	(0.002)	(0.007)	(0.008)	(0.008)
$CCPI_{lender}$ × Specialized Loan				0.034**	0.039**	0.030*
				(0.015)	(0.018)	(0.017)
Controls & Fixed Effects:						
Bank Group Controls		✓	✓		✓	✓
Country Controls			✓			✓
Loan FE	✓	✓	✓	✓	✓	✓
Obs.	12,478	12,478	11,530	12,478	12,478	11,530
R^2	0.460	0.462	0.465	0.841	0.843	0.853
Mean(Dep. Var.)	0.291			7.722		

A race-to-the-bottom mechanism predicts that banks should extend cross-border loans to borrowers similar to their domestic ones (screening and monitoring costs lower + cross-border lending less difficult)

Specialized loan = 1 if the cross-border **loan is in the banks' specialized industry**

Specialized industry = industry with highest loan amount from the lender in year t-1 in the domestic syndicated loan market

The likelihood of granting a specialized loan and the cross-border loan share increase with the stringency of home-country climate policy

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Race-to-the-bottom: How does the effect differentiate with respect to lender's characteristics?

Lender Share	Size		Cross-Border		Capital		NPL	
	(1) Low	(2) High	(3) Low	(4) High	(5) Low	(6) High	(7) Low	(8) High
$CCPI_{lender}$	0.018**	0.061***	0.022**	0.107***	0.053***	0.045***	0.031*	0.097***
	(0.008)	(0.010)	(0.009)	(0.013)	(0.013)	(0.009)	(0.018)	(0.031)
Fixed Effects:								
Loan FE	✓	✓	✓	✓	✓	✓	✓	✓
Obs.	5,356	5,337	5,328	5,459	5,406	5,626	847	881
R^2	0.843	0.858	0.842	0.846	0.841	0.861	0.838	0.808
Mean(Lender Share)	7.722							
Difference	0.043***		0.085***		-0.008		0.065*	

Size: Log(Total assets)

Cross-border: Ratio of cross-border lending to total lending → Proxy for banks' experience

Capital: Tier 1 capital ratio

NPL: Nonperforming loans ratio

The effect is stronger for larger, more experienced in cross-border lending banks, and banks with high NPL ratios → in line with race-to-the-bottom behavior

Motives for the race-to-the-bottom: Climate policy stringency and corporate profits

	ROE	ROC	Net Margin	Opr. Margin
	(1)	(2)	(3)	(4)
CCPI	-0.007**	-0.004*	-0.007**	-0.004*
	(0.003)	(0.002)	(0.003)	(0.002)
Controls & Fixed Effects:				
Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Obs.	214	213	216	216
R^2	0.302	0.291	0.337	0.395
Mean(Dep. var.)	0.096	0.079	0.076	0.097

We use Return on Equity, Return on Capital, Net Profit Margin, and Operating Margin as firm profit indicators at the country level

Standard errors are robust

The changes induced by stringent climate policy may hurt the firms' profitability, which in turn can lead the lenders to increase their lending abroad

Motives for the race-to-the-bottom: Climate policy stringency affects the performance of loan portfolios

	Nonperforming Loans Ratio				Net Profit Ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CCPI_{lender,\ t-1}$	0.032**	0.031*	0.037**	0.013	-4.628***	-1.533***	-1.411***	-1.058**
	(0.014)	(0.017)	(0.016)	(0.022)	(0.762)	(0.515)	(0.479)	(0.461)
$CCPI_{lender,\ t-1}$ × Cross-Border Lender				-0.060**				2.990*
				(0.024)				(1.577)
Controls & Fixed Effects:								
Controls			✓	✓			✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓				✓			
Bank FE		✓	✓	✓		✓	✓	✓
Obs.	24,297	23,434	23,216	23,076	179,856	178,323	177,236	176,286
R^2	0.318	0.943	0.943	0.943	0.156	0.527	0.529	0.529
Mean(Dep. Var.)	4.893				24.786			

Climate policies hurt banks' loan portfolios → cross-border lending enables banks to circumvent these adverse effects

Stringent climate policy may worsen domestic firms' performance→ the performance of banks' loan portfolios

Columns (1)-(3) positive association with NPL ratio; Columns (5)-(7) negative associated with banks' profits → motives for a race-to-the-bottom

Columns (4) and (8) suggest that cross-border lending enables banks to circumvent the adverse effects of climate policies

Cross-Border Lender = 1 if the lender engages cross-border lending

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Motives for the race-to-the-bottom: Which component of the CCPI matters the most?

	Lender Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Climate policy$_{lender}$	0.065***				0.069***	0.065***
	(0.013)				(0.012)	(0.013)
Renewable energy$_{lender}$		0.111**			0.020	0.037
		(0.049)			(0.053)	(0.055)
Energy efficiency$_{lender}$			0.111***		0.039	0.027
			(0.042)		(0.079)	(0.084)
GHG emissions improvement$_{lender}$				0.037***	0.035	0.032
				(0.014)	(0.022)	(0.023)
Controls & Fixed Effects:						
Bank Group Controls	✓	✓	✓	✓	✓	✓
Borrower × Year FE					✓	
Loan FE	✓	✓	✓	✓		✓
Obs.	12,478	12,478	12,478	12,478	12,478	12,478
R^2	0.842	0.841	0.841	0.841	0.809	0.842
Mean(Lender Share)	7.722					

Climate Policy captures policy actions against climate change and is forward-looking

The Climate Policy component can be the main determinant for cross-border lending if banks care about the risks that a stricter climate policy may bring for firms' production processes, profitability, and ability to repay a loan.

Other three categories may suffer from collinearity as they proxy the outcome of a country's climate politics.

Remaining concerns

Results show that a more stringent climate policy leads to an increase in cross-border lending

Results show that the increase in cross-border lending is due to banks' regulatory arbitrage

- Banks can circumvent climate policies by using cross-border lending

- Remaining concerns:
  - ✓ Alternative measures of climate policy stringency
  - ✓ Aggregate cross-border credit supply
  - ✓ Regional patterns in the increase in cross-border lending

Alternative climate policy indices

	Lender Share					
	(1)	(2)	(3)	(4)	(5)	(6)
C3-I_{lender}	0.141*	0.162*	0.128			
	(0.072)	(0.093)	(0.131)			
EPI_{lender}				0.075***	0.070***	0.064***
				(0.011)	(0.011)	(0.022)
Controls & Fixed Effects:						
Bank Group Controls		✓	✓		✓	✓
Country Controls			✓			✓
Loan FE	✓	✓	✓	✓	✓	✓
Obs.	1,897	1,897	1,742	11,889	11,889	10,833
R^2	0.817	0.822	0.818	0.833	0.835	0.846
Mean(Lender Share)	7.081			7.918		

We test the robustness of our results to alternative climate policy indices:

1. The Climate Change Cooperation Index (C3-I) by Bernauer and Böhmelt (2013)

2. The Environmental Policy Index developed by YCELP, CIESIN, and the World Economic Forum

Results are robust to alternative climate policy stringency indices

Aggregate cross-border credit supply

	log(Number of loans)				log(Loan amount)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ CCPI	0.025***	0.028***	0.036***	0.028***	0.029***	0.055***	0.073***	0.057***
	(0.005)	(0.004)	(0.005)	(0.005)	(0.008)	(0.009)	(0.010)	(0.011)
Controls & Fixed Effects:								
Borrower country FE		✓				✓		
Borrower country × Year FE			✓	✓			✓	✓
Bank Group Controls				✓				✓
Obs.	4,211	4,208	4,185	4,185	4,211	4,208	4,185	4,185
R^2	0.058	0.265	0.318	0.354	0.024	0.222	0.309	0.373
Mean(dep. var.)	2.198				19.495			

We aggregate our loan level data up to lender level

Analysis of impact bank home-borrower home CCPI differentials on cross-border syndicated lending

We study the number and the volume of cross-border lending from bank i to destination country j

Control for the demand with borrower country x year FE

CCPI changes may cause higher lender shares that are offset by fewer loans → Our results are robust to this conjecture

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Are there regional patterns?

Lender Share	Europe vs USA	Europe vs Emerging markets	Europe vs Europe	Europe vs Asia	Europe vs Anglo-Saxon
	(1)	(2)	(3)	(4)	(5)
$CCPI_{lender}$	0.029	0.131***	0.008	0.110	0.040*
	(0.026)	(0.032)	(0.016)	(0.071)	(0.023)
Controls & Fixed Effects:					
Bank Group Controls	✓	✓	✓	✓	✓
Loan FE	✓	✓	✓	✓	✓
Obs.	3,751	885	3,069	371	4,091
R^2	0.820	0.894	0.907	0.864	0.833
Mean(Lender Share)	7.722				

We study regional patterns to see the direction of cross-border lending

We focus on European lenders' cross-border lending

The positive effect of climate policy stringency on cross-border lending is strongest for emerging markets

→ European lenders channel their credit supply towards emerging markets due to a more stringent climate policy at home

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Tentative conclusions

- We investigate whether banks use cross-border lending to react to a change in climate policy stringency in their home country

- Banks exploit uncoordinated national climate policies by refocusing syndicated lending from ‘green’ to ‘brown’ countries and firms

- Lack of policy harmonization may trigger a *race-to-the-bottom* behavior by banks and threaten the effectiveness of climate policies