



Measurement and Effects of Bank Exit Policies

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Motivation

- Abundant public debate around **targeted exit policies** from **financial institutions** as a tool to accelerate the energy transition away from fossil fuel to limit climate change
- Theoretically, such actions should increase the cost of funding, or even **ration capital**, for targeted firms if such policies are sufficiently widespread and/or there are important **frictions** in capital markets
- Such **financial effects** may translate into the **real effects** intended by such policies: reduction of capital expenditures, facility decommissioning, and ultimately decrease in CO2 emissions...

Exiting Coal

- We focus on the **coal industry** (both coal mining and coal-fueled power plants)
- Coal is the **largest** source of CO₂ emissions globally, and is more carbon-intensive than any other source of energy
- The coal industry is **highly capitalistic**: financial effects are more likely to translate into economically significant **real effects**
- The coal industry mostly relies on **bank-intermediated debt**: bank exit policies are likely to translate into **financial effects**, because historic bank lenders are **hard to substitute** due to the informational function of relationships
- The coal industry is the **seminal target**, and still the main target, of bank exit policies, and can set a **blueprint for the oil and gas industry**

Research Question(s)

- **Do bank exit policies affect the financing and real outcomes of targeted firms?**
- Are such policies an effective tool to **mitigate climate change?**

Case Study: Refinancing CONSOL Energy's Revolver

Lender	Prior Commitment	Extending Commitment
The Huntington National Bank	\$ 41,400,000.00	\$ 0.00
Citibank, N.A.	\$ 41,400,000.00	\$ 0.00
Credit Suisse AG, Cayman Islands Branch	\$ 41,400,000.00	\$ 0.00
Bank of America, N.A.	\$ 41,400,000.00	\$ 0.00
JPMorgan Chase Bank, N.A.	\$ 40,500,000.00	\$ 0.00
Goldman Sachs Bank USA	\$ 35,000,000.00	\$ 0.00
Chemical Bank	\$ 23,000,000.00	\$ 0.00
First Horizon Bank	\$ 10,000,000.00	\$ 0.00
First Commonwealth Bank	\$ 7,500,000.00	\$ 0.00
PNC Bank, National Association	\$ 41,400,000.00	\$ 50,000,000.00
Manufacturers and Traders Trust Company	\$ 27,000,000.00	\$ 35,000,000.00
Northwest Bank	\$ 19,000,000.00	\$ 35,000,000.00
First National Bank of Pennsylvania	\$ 19,000,000.00	\$ 25,000,000.00
Stifel Bank & Trust	\$ 12,000,000.00	\$ 12,000,000.00
Summit Community Bank	\$ 0.00	\$ 35,000,000.00
First Foundation Bank	\$ 0.00	\$ 25,000,000.00
City National Bank of West Virginia	\$ 0.00	\$ 20,000,000.00
Dollar Bank, Federal Savings Bank	\$ 0.00	\$ 18,000,000.00
Washington Financial Bank	\$ 0.00	\$ 5,000,000.00
TOTAL:	\$ 400,000,000.00	\$ 260,000,000.00

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Research Design

- Coal companies/sponsors are **differentially exposed** to bank exit policies due to:
 - Variation in bank-borrower **relationships**
 - Variation in the **strength and timing** of bank exit policies
- We exploit this **plausibly exogenous variation** to gauge the effect of bank exit policies on borrower outcomes

Preview of Results

- Measurement of Exit Policies:
 - Size weighted, **most banks have policies**
 - **Substantial heterogeneity** in their strength and timing, largely explained by **geography**
 - Banks with **strong** exit policies appear to be **"walking the talk"**
- Effects on Targeted Firms: **large and consistent with intended effects**
 - *Financial Effects*: ↓ Debt Issuance and Long-Term Debt
 - No evidence of significant substitution to other sources of capital
 - *Real Effects*: ↓ Total Assets, ↑ Accelerated Plant Closures and ↓ in CO_2 emissions

Literature

- Climate finance and major tools to address climate change such as:
 - cap and trade policies (Ivanov et al., 2021, Colmer et al., 2022)
 - carbon taxes (Laeven and Popov, 2022)
 - innovation (Aghion et al., 2023, Bolton et al., 2022)

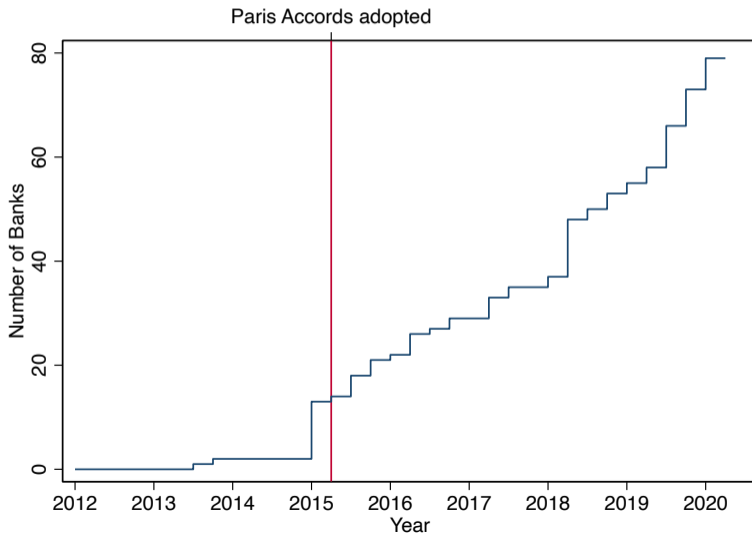
→ *We highlight financial institutions unique position to complement such actions*
- Financial institutions pursuing non-financial objectives through:
 - capital allocation strategies (Green and Roth, 2023)
 - ESG strategies (Pastor et al., 2023)
 - activist strategies such as shareholder voting (Broccardo et al., 2022)
 - innovative security design (Kim et al, 2022, Loumiotis and Serafeim, 2022)

→ *We focus on a specific type of capital allocation strategy: exit policies*
- Effectiveness of Financial Institutions strategies:
 - Impact Investing: Oehmke and Opp (2022), Hartzmark and Shue (2022)
 - Exit Policies (Equity): Berk and Van Binsbergen (2021), Broccardo et al. (2022)
 - Exit Policies (Debt): Haushalter et al. (2022), Sachedeva et al. (2022), Kacperczyk and Peydro (2022), Marques-Ibanez et al. (2024)

→ *We provide evidence of large effects aligned with the intended goals, and flesh out necessary conditions for such effects*

Measuring the Strength of Exit Policies

Number of banks with a coal exit policy



Examples of Coal Exit Policy

Wells Fargo

Mining

Wells Fargo provides financing for coal and metal mining customers around the world. Consistent with our approach to doing business with customers in other environmentally sensitive industries, we seek to maintain relationships only with responsible companies in the industry. **Wells Fargo restricts the financing of mountain top removal (MTR) companies and is committed to limiting and decreasing the financing of coal mining specific companies.**

- Coal mining. Wells Fargo has limited and declining exposure to the coal mining industry. Since 2011, market and regulatory forces have led to a new paradigm for U.S. coal producers. The amount of electricity produced from coal declined from 50 percent in 2005 to 30 percent in 2017, and the Dow Jones U.S. Coal Index, which captures the largest listed coal companies, fell more than 90 percent from 2011 to 2017.

We engage with industry experts as well as community organizations to maintain a deep understanding of specific environmental and social risks associated with coal mining, which has influenced our credit and capital markets decisions. Wells Fargo will continue to limit and reduce our credit exposure to the coal mining industry. As a relationship-based bank, our clients place their trust in us. We will continue to support our existing coal mining customers with capital markets expertise and other products in some circumstances, to help them manage the changing economics.

We recognize the elevated community concerns associated with the practice of MTR coal mining techniques, and we have prohibited credit exposure to companies using these practices. According to the U.S. Energy Information Administration, coal production from mines with MTR permits has declined since 2008, more than the downward trend in total U.S. coal production. Total U.S. coal production decreased about 38 percent from 2008 to 2016, while MTR decreased more than 70 percent during this period. **Wells Fargo does not directly finance MTR coal mining projects, nor do we extend credit or facilitate capital markets transactions to coal producers engaged primarily in MTR mining.**

Industry-specific environmental and social risk due diligence is conducted by our customer relationship and investment teams in partnership with our ESRM team on all credit and capital markets transactions involving clients in any type of coal mining industry, and all coal mining credit transactions are escalated and require approval by Wells Fargo's senior credit authorities. Together we assess a company's commitment, capacity, and track record on issues including worker safety, GHG, water and air impacts, human rights, and stakeholder relations.

Barclays

In recognition of the fact that Barclays needs to go further in the approach taken to this industry, we are also now introducing the following restrictions:

- From 2020, we will not provide any financing to clients that generate more than 50% of revenue from thermal coal activities (mining and/or coal fired power generation);
- By 2025, we will no longer provide any financing to clients that generate more than 30% of revenue from thermal coal activities;
- By 2030, we will no longer provide any financing to clients that generate more than 10% of revenue from thermal coal activities;
- We will provide transition finance for companies reducing their thermal coal portfolio (including retro fitting of existing facilities). For those unable to transition their portfolio, we will provide financing for decommissioning plants;
- We will also not provide general corporate financing that is specified as being for new or expanded coal mining or coal-fired power plant development.

Encoding Exit Policies (1/2)

We define a **set of variables** to comprehensively describe banks' exit policies:

Variable Name	Definition	Share of Policies Conditioning
isNew:	= 1 if proceeds used for new coal assets/project	82%
isPowerProj:	= 1 if project is a power project	77%
isMiningProj:	= 1 if project is a mining project	51%
isMiningCo:	= 1 if company a mining company	46%
isPowerCo:	= 1 if company a power company	42%
CoalFracRevParent:	= fraction of revenue from coal of parent company	42%
isExpansion:	= 1 if proceeds used for expansion of capacity/life of coal assets	41%
isThermal:	= 1 the project uses thermal coal	35%
hasDecarbonStrat:	= 1 if Company has plan to decarbonize/diversify from carbon	30%
TimeRestriction:	= 1 if ban has a time schedule	28%
isMountaintopComp:	= 1 if company is doing mountaintop mining	26%
isNewCustomer	= 1 if the borrower a new customer	24%
isLowCarbonProj:	= 1 if proceeds used for carbon transition / low carbon project	20%
isProjFin:	= 1 for project finance	18%
CoalSharePowerParent:	= coal share of power production of parent company	15%
GeographicalRestriction:	= 1 if ban only applies to certain country or continent	11%
isMountaintopProj:	= 1 if proceeds used for mountaintop mining	7%

Encoding Exit Policies (2/2)

We then translate each policy into a **function** that determines whether a given financing will be banned by a given bank in a given year:

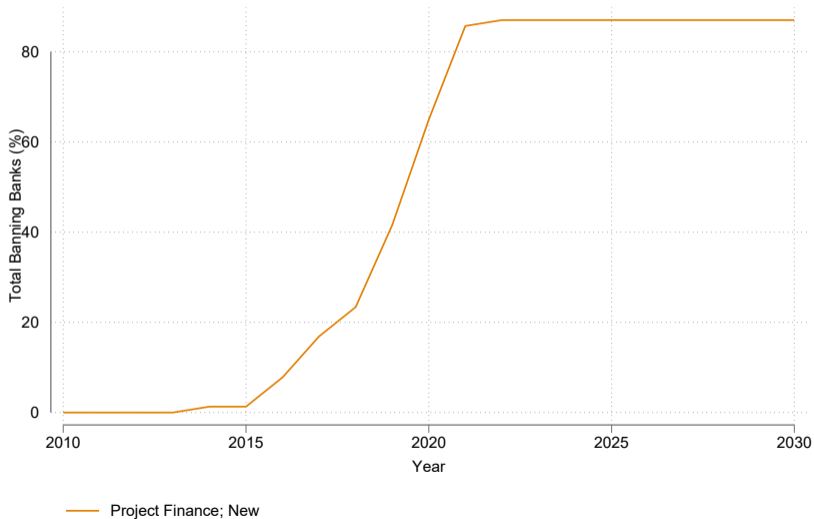
* Barclays Divestment Policy

```
gen ban = 1 if ((year > 2019 & isMountaintopProj) |  
              (year > 2019 & (isProjFin & (isNew | isExpansion) & isPowerProj)) |  
              (year > 2019 & (isProjFin & (isNew | isExpansion) & isMiningProj & isThermal)) |  
              (year > 2020 & ((isThermal==1 & isMiningCo==1) | isPowerCo == 1) & (CoalFracRevParent > 0.5)) |  
              (year > 2025 & ((isThermal==1 & isMiningCo==1) | isPowerCo == 1) & (CoalFracRevParent > 0.3)) |  
              (year > 2030 & ((isThermal==1 & isMiningCo==1) | isPowerCo == 1) & (CoalFracRevParent > 0.1)))
```

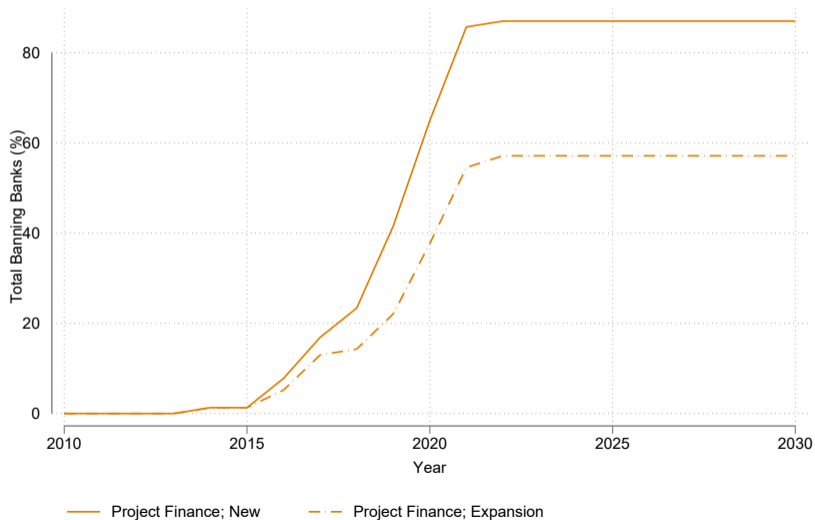
* Wells Fargo Divestment Policy

```
gen ban = 1 if year > 2015 & isMountaintopProj
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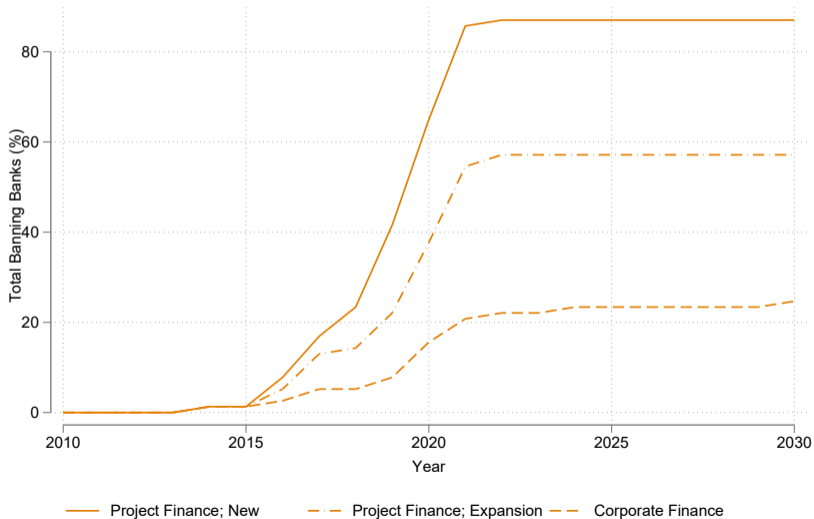
Do Exit Policies Have Teeth?



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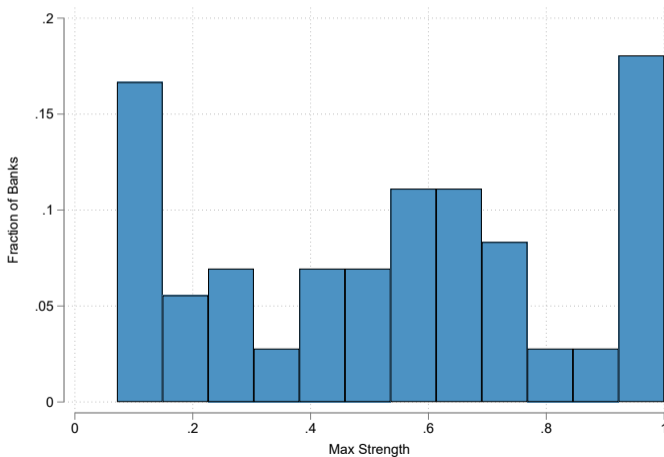
Heterogeneity in Exit Policy Strength (1/2)

We define a set of scenarios to assess the strength of banks' exit policies:

Scenario	Share of Banks Prohibiting	
	As of 2020	At maximum
isPowerProj=1, isNew=1, isNewCustomer=1, isProjFin=1	73%	96%
isPowerProj=1, isNew=1, isNewCustomer=0, isProjFin=1	69%	93%
isPowerProj=1, isExpansion=1, isNewCustomer=1, isProjFin=1	54%	74%
isPowerProj=1, isExpansion=1, isNewCustomer=0, isProjFin=1	46%	69%
isPowerProj=1, isNewCustomer=1, isProjFin=0	38%	55%
isPowerProj=1, isNewCustomer=1, isProjFin=0, CoalFracRevParent ≥ 0.2	22%	36%
isPowerProj=1, isNewCustomer=0, isProjFin=0, CoalFracRevParent ≥ 0.2	19%	34%
isMiningProj=1, isNew=1, isNewCustomer=1, isProjFin=1	50%	73%
isMiningProj=1, isNew=1, isNewCustomer=0, isProjFin=1	30%	43%
isMiningProj=1, isExpansion=1, isNewCustomer=1, isProjFin=1	41%	59%
isMiningProj=1, isExpansion=1, isNewCustomer=0, isProjFin=1	32%	50%
isMiningProj=1, isNewCustomer=1, isProjFin=0	38%	53%
isMiningProj=1, isNewCustomer=1, isProjFin=0, CoalFracRevParent ≥ 0.2	19%	34%
isMiningProj=1, isNewCustomer=0, isProjFin=0, CoalFracRevParent ≥ 0.2	15%	30%

Heterogeneity in Exit Policy Strength (2/2)

For each bank, we calculate the share of scenarios that are banned in a given year

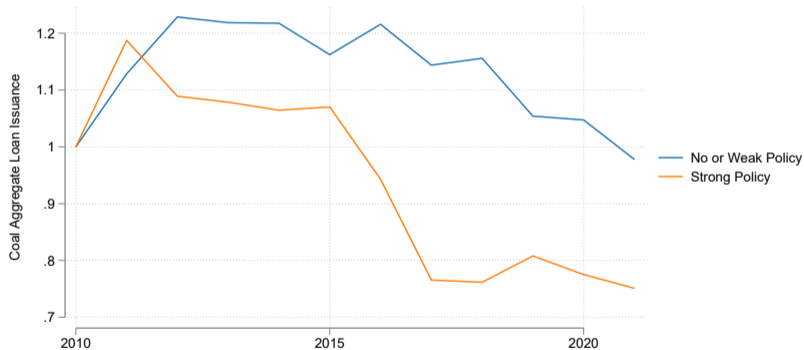


Are Exit Policies Cheap Talk?

Determinants of Exit Policy Strength

	Policy Existence and Strength				
	(1)	(2)	(3)	(4)	(5)
Bank Size	0.236*** (0.029)	0.248*** (0.034)	0.255*** (0.035)	0.188*** (0.040)	0.182*** (0.043)
Coal Share of Lending		0.183 (0.200)	0.106 (0.242)	0.138 (0.338)	0.371 (0.313)
Bank Coal Financing Growth			0.091 (0.091)	0.070 (0.116)	0.136 (0.122)
Coal Borrowers' Credit Growth			0.144 (0.156)	0.171 (0.193)	0.179 (0.178)
2020 Bank ESG Score				0.073** (0.036)	0.035 (0.031)
2020 Bank E Score				0.081*** (0.031)	0.062** (0.027)
Asia					-0.066 (0.115)
Europe					0.820*** (0.240)
North America					-0.390* (0.217)
Constant	-1.494*** (0.213)	-1.628*** (0.287)	-1.695*** (0.294)	-1.868*** (0.350)	-1.651*** (0.376)
Observations	231	231	225	172	172
R ²	0.269	0.270	0.290	0.364	0.509

Are banks walking the talk? (1/2)



Are banks walking the talk? (2/2)

	Coal Debt Origination (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{Has Exit Policy}\}_{b,t}$	-0.298*** (0.098)	-0.236** (0.099)	-0.223** (0.096)	-0.241** (0.104)	-0.256*** (0.097)	
$\mathbb{1}\{\text{Has Exit Policy (Non-Updated)}\}_{b,t}$						-0.285*** (0.100)
$\mathbb{1}\{\text{Year} \geq 2015\} \times \text{Max Strength}_b$		-0.140*** (0.052)				
$\mathbb{1}\{\text{Year} \geq 2015\} \times \text{Max Strength (RF)}_b$			-0.189*** (0.052)			
$\mathbb{1}\{\text{Year} \geq 2015\} \times \text{Max Strength (RF Phaseout)}_b$				-0.166*** (0.046)		
$\mathbb{1}\{\text{Year} \geq 2015\} \times \text{Max Strength (Complexity)}_b$					-0.132*** (0.050)	
$\mathbb{1}\{\text{Year} \geq 2015\} \times \text{Max Strength (Non-Updated)}_b$						-0.106** (0.049)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	984	984	984	899	984	984
Adj-R ²	0.804	0.805	0.806	0.812	0.805	0.805

Are exit policies a true supply shock?

Isolating the Supply Channel: Borrower \times Year FEs

	Debt Issuance (log)				
	(1)	(2)	(3)	Power (4)	Mining (5)
Exit Policy Strength $_{b,t}$	-0.229** (0.115)			-0.241 (0.147)	-0.218 (0.138)
Low Coal Share $_f \times$ Exit Policy Strength $_{b,t}$		-0.156 (0.151)			
High Coal Share $_f \times$ Exit Policy Strength $_{b,t}$		-0.415** (0.173)			
Small Firm \times Exit Policy Strength $_{b,t}$			-0.224 (0.159)		
Large Firm \times Exit Policy Strength $_{b,t}$			-0.294** (0.148)		
Bank FE	Yes	Yes	Yes	Yes	Yes
Borrower \times Year FE	Yes	Yes	Yes	Yes	Yes
Observations	139,100	129,467	125,242	63,934	75,166
Adj-R ²	0.270	0.270	0.263	0.292	0.265

How is coal firms' net financing affected?

Borrower Sample

- Our sample includes the **486 firms** (out of 935 firms appearing on the **Global Coal Exit List**) that have borrowing activity in IJGlobal, DealScan, or SDC Platinum for the period 2010-2021
- The sample accounts for **75% of worldwide annual coal production** and **76% of installed coal power capacity**
- **Geographic breakdown** is in line with global coal usage: 54% Asia, 19% North America, 13% Europe and 14% Others

Shift-Share Instrument Construction

- Let $B_{b,t}$ be the **strength of a bank exit policy**, measured as the unweighted fraction of scenarios banned by bank b in year t :
- Let $w_{f,b}$ be the **share of firm f financing volume with bank b** over the period 2009-2014
- Our main instrument is defined as:

$$\mathbf{Bank\ Exit\ Exposure}_{g,t} = \sum_b w_{f,b} \times B_{b,t}$$

Are targeted firms facing capital rationing?

	Debt Issuance (log)					
	(1)	(2)	(3)	(4)	Power (5)	Mining (6)
Bank Exit Exposure $_{f,t}$	-0.153** (0.073)	-0.199** (0.094)			-0.090 (0.137)	-0.263* (0.136)
Low Coal Share \times Bank Exit Exposure $_{f,t}$			-0.087 (0.108)			
High Coal Share \times Bank Exit Exposure $_{f,t}$			-0.394*** (0.139)			
Small Firm \times Bank Exit Exposure $_{f,t}$				-0.404** (0.167)		
Large Firm \times Bank Exit Exposure $_{f,t}$				-0.173 (0.123)		
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country \times Year FE	No	Yes	Yes	Yes	Yes	Yes
Size \times Year FE	No	Yes	Yes	No	Yes	Yes
Observations	4,524	4,238	3,926	3,445	1,859	2,197
Adj-R ²	0.479	0.532	0.537	0.519	0.560	0.522

→ One S.D. in borrower's exposure to exit policies leads to a ca. **15% drop in their debt issuance**

Are exposed firms substituting their sources of capital?

	Debt Issuance (log)								Equity
	Coal Policy Bank		Relationship Bank		Non-Bank		Margin		
	Yes	No	Yes	No	Yes	No	Extensive	Intensive	
Bank Exit Exposure _{<i>f,t</i>}	-0.182** (0.077)	-0.056 (0.073)	-0.190*** (0.071)	-0.042 (0.079)	0.079* (0.047)	-0.217** (0.093)	-0.031* (0.016)	-0.059 (0.074)	0.040 (0.039)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,238	4,238	4,238	4,238	4,238	4,238	4,238	2,369	4,238
Adj-R ²	0.637	0.497	0.566	0.572	0.388	0.534	0.400	0.607	0.187

How are coal firms' operations and emissions affected?

Effects on Firm Size

	Total Assets (log)					
	(1)	(2)	(3)	(4)	Power (5)	Mining (6)
Bank Exit Exposure $_{f,t}$	-0.094** (0.044)	-0.247*** (0.082)			-0.274** (0.135)	-0.186** (0.094)
Low Coal Share \times Bank Exit Exposure $_{f,t}$			-0.287*** (0.094)			
High Coal Share \times Bank Exit Exposure $_{f,t}$			-0.221** (0.103)			
Small Firm \times Bank Exit Exposure $_{f,t}$				-0.285*** (0.101)		
Large Firm \times Bank Exit Exposure $_{f,t}$				-0.142*** (0.048)		
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country \times Year FE	No	Yes	Yes	Yes	Yes	Yes
Size \times Year FE	No	Yes	Yes	No	Yes	Yes
Observations	2,530	2,366	2,173	2,366	1,070	1,189
Adj-R ²	0.604	0.620	0.632	0.620	0.636	0.616

Plant-level Analysis

- Focus on **coal-fired power plants**
- Collect data on plant-level characteristics, **operating status** and **CO₂ emissions**
- Link plant level data to **ownership** in our main firm-level sample
- Cox Proportional Hazard Model to predict plant closure and panel regressions to study emissions.

Do Exit Policies Affect Plant Operation?

	Plant Closure				
	Pre-Period	Full Sample			
	(1)	(2)	(3)	(4)	(5)
Bank Exit Exposure (Max) _f	0.995 (-0.018)	0.822 (-1.441)	0.813 (-1.363)	0.794 (-0.973)	0.826 (-1.367)
Year ≥ 2015 × Bank Exit Exposure (Max) _f		1.409** (2.444)	1.493*** (2.792)	1.329 (1.244)	1.365** (2.086)
Year ≥ 2015 × Bank Exit Exposure (Max) _f × Small Firm			4.123* (1.926)		
Year ≥ 2015 × Bank Exit Exposure (Max) _f × Low Coal Share				1.353 (1.119)	
Year ≥ 2015 × Bank Exit Exposure (Max) _f × Large Plant					1.168 (0.618)
Country Strata	Yes	Yes	Yes	Yes	Yes
Observations	14225	30571	30571	29777	30571

Does Divestment Affect CO2 Emissions

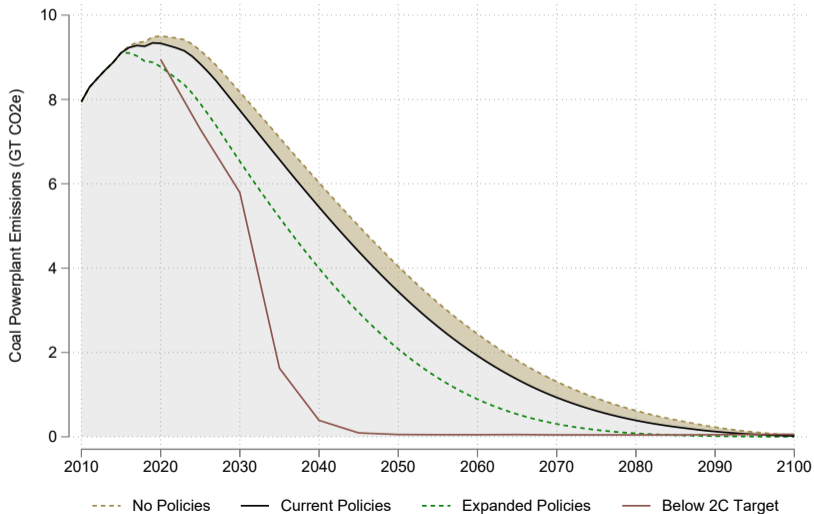
	Emissions	Active Facilities Only	Active (1/0)	Carbon Intensity
	(1)	(2)	(3)	(4)
Bank Exit Exposure $(\text{Max})_f \times \mathbb{1}\{\text{Year} \geq 2015\}$	-0.086** (0.035)	-0.057* (0.027)	-0.046*** (0.016)	-0.005 (0.020)
Facility FE	Yes	Yes	Yes	Yes
Country x Year FE	Yes	Yes	Yes	Yes
Observations	3,656	3,319	3,719	1,985
Adj-R ²	0.497	0.470	0.413	0.730

Can Finance Save the World?

Quantifying the Aggregate Effects

- We consider two main counter-factual exercises:
 - how much higher would GHG emissions from coal-powered electricity generation be in absence of coal exit policies by banks?
 - what additional reduction in emissions can be achieved if strong exit policies are adopted by every bank?
- We estimate the evolution of aggregate coal-fired power plant emissions over the 2015-2100 period under these scenarios based on
 - comprehensive data on existing and planned coal-fired power plants
 - a survival process of these plants,
 - how that survival is affected by bank coal exit policies as previously estimated

Counterfactual Analysis



Conclusion

- Targeted exit policies by banks have economically significant **real and financial effects**, in line with their intended goals
- **No detectable substitution** to other forms and providers of capital
- Effects concentrated in smaller and **more concentrated** firms
- Aggregate impact of coal exit policies **economically significant, but currently likely limited by extent and distribution of adoption**

Thank You!