

Common Ownership, Climate Risk and Lending

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Preliminary – please do not quote



Motivation

- **High exposure of banks to fossil fuel companies (FFs)** Beyene, Delis, de Greiff, and Ongena, 2024; Delis, de Greiff, Iosifidi and Ongena, 2024, Financial markets, institutions & instruments; Banking on Climate Chaos Report, 2024
 - 60 biggest banks worldwide lent USD 6,900 bn to fossil fuel industry in the last 8 years
 - Implications of climate risk exposure for financial stability Battiston, Mandel, Monasterolo, Schütze and Visentin, 2017, Nature Climate Change
- Little is known about **other ties** between banks and FFs
- How does **common ownership (CO)** affect banks' exposure to climate risk?
 - Evolution of CO between banks and FFs **over time** (before/after Paris agreement)
 - How CO between banks and FFs impact **lending conditions – quantity and pricing**

Main results in brief

1. CO between banks and FFs increased **more** than CO between banks and other firms, after the Paris Agreement
2. CO affects the **terms** of syndicated loans
 - The **total amount of loan** increases with CO shares in banks
 - The effect is **less pronounced but still positive** in the case of **fossil fuel borrowers**
 - The **price of loan** decreases with higher common investors' holdings in lenders
 - The effect is **more pronounced** in the case of **fossil fuel borrowers**
- Investors' investments in banks may alleviate regulatory pressure on fossil fuel firms to decarbonize by offering loans at better terms

Contribution to the literature

- Growing literature on CO among firms He and Huang, 2017, RFS; Amel-Zadeh et al., 2022; Backus et al., 2021, American Economic Journal: Microeconomics; Gilje et al., 2020, JFE
- CO among firms in the **same industry industry** leads to
 - **Less competition:** i) **more coordination** between competitors He and Huang, 2017, The Review of Financial Studies; ii) **higher prices** Azar et al., 2018, JF
 - **Better market-based governance:** More active **monitoring** of management He et al., 2019, JFE
 - **Better disclosure:** Lower **proprietary cost** and some **internalization** of the benefits of disclosure Park et al., 2019
 - **Inconclusive** effect on **corporate social responsibility** Dai and Qiu, 2021; Cheng et al., 2022, JBF

Contribution to the literature – cont.

- Recent paper study **vertical** CO in firms Kedia et al., 2017, JF
 - CO between **borrowers** and **lenders** lead to **lower loan spreads** Wang and Wang, 2024, JBF and **higher lending amounts** in syndicated loan market Ojeda, 2019
 - CO between borrowers and (**outside**) banks impacts borrowers' bargaining power as it lowers loan spreads in existing lending contracts in syndicated loan market He et al., 2024

An assessment of **common ownership between banks and firms** and its effects in the syndicated loans market **in the context of climate change** is still missing

Methodology

- We use two measures of CO He and Huang, 2017
 - **Number overlapping investors** is number of overlapping shareholders between a bank and a firm
 - **CO shares held by overlapping investors** is the sum of all the shares held by the overlapping investors in a given firm-bank pair
 - **CO shares in banks** = Sum of shares held in a bank - bank perspective
 - **CO shares in firms** = Sum of shares held in a firm - firm perspective

Construction of CO measures

Date	Firm/Borrower	Pct. equity in firm	Investor (Cons.)	Pct. equity in bank	Bank
30/06/2015 (before Paris)	FIRM A	5.68	Investor 1	4.96	BANK B
		4.4	Investor 2	7.13	
		6.1	Investor 3	4.04	
30/06/2016 (after Paris)	FIRM A	5.94	Investor 1	4.9	BANK B
		4.59	Investor 2	8.11	
		6.62	Investor 3	4.47	

overlapping investors (before Paris) = 3

overlapping investors (after Paris) = 3

CO shares in firm (before Paris) = 16.18%

CO shares in firm (after Paris) = 17.15%

CO shares in bank (before Paris) = 16.13%

CO shares in bank (after Paris) = 17.48%

Data

- **Firms:** Largest US publicly listed firms borrowing in the syndicated loans market
- Sectoral disaggregation based on Climate Policy Relevant Sectors methodology (CPRS; Battiston et al., [2017](#))
 - **Treatment group** - high risk: 39 firms from CPRS 1-fossil-fuel (e.g. Exxon Mobil Corp, Conocophillips, EOG Resources Inc, Marathon Petroleum Corp, Valero Energy Corp, etc.)
 - **Control group** - lower risk: 44 firms from other CPRSs (e.g. AT&T Inc, General Electric Co, IBM Corp, Johnson & Johnson, Lowe's Companies Inc, PepsiCo Inc, Procter & Gamble Co, Union Pacific Corp, etc.)
- **Banks:** 47 global banks that have participated in at least one loan syndicate (e.g. JPMorgan, Bank of America Corp, Citigroup Inc, Morgan Stanley, Wells Fargo, Deutsche Bank AG, Goldman Sachs Group Inc, ING Groep NV, etc)

Climate Policy Relevant Sectors (CPRS) Methodology

(Battiston, Mandel, Monasterolo, Schütze and Visentin, 2017, Nature Climate Change)

- CPRS Methodology allows us to classify companies based on their climate transition risk exposure
 - More comprehensive assessment of transition risk
 - Less green-washing prone
 - Public available and adopted by main international financial institutions (e.g., ECB, EBA, MAS, etc.)
- Provides a mapping of NACE Rev.2 4-digit codes into classes of transition risk (decreasing order) based on:
 - Energy technology composition of revenues
 - Business model and substitutability of fossil fuel
 - Contribution to GHG emissions (Scope 1,2,3)
 - Relevance for climate policy implementation (costs sensitivity, e.g. to EU carbon leakage directive 2003/87/EC)

Data – cont.

- **Time frame:** 2012-2018
- Quarterly information about **equity shareholders** from **Thomson Reuters Global Ownership** database
 - 13F filings (79% of filings) & other filing types (e.g. 13D/13G, etc.)
 - We consider consolidated investors (investment companies) with substantial holdings ($\geq 5\%$ in firms and $\geq 1\%$ in banks of the total value of traded equity shares).
- **Syndicated loans** data from **Refinitiv Dealscan**
- **Control variables** retrieved from **Compustat**

Common ownership measures

	Firm-Bank pair	Paris	# Obs.	Mean
# overlapping investors	FossilFuel-Bank	Before	22068	1.45
	FossilFuel-Bank	After	23907	2.13
	Other-BANK	Before	24252	1.45
	Other-BANK	After	26273	1.97
CO shares in firms (%)	FossilFuel-Bank	Before	22068	9.81
	FossilFuel-Bank	After	23907	16.54
	Other-BANK	Before	24252	9.00
	Other-BANK	After	26273	13.49
CO shares in banks (%)	FossilFuel-Bank	Before	22068	6.65
	FossilFuel-Bank	After	23907	10.85
	Other-BANK	Before	24252	6.82
	Other-BANK	After	26273	10.74

Common ownership over time: Average number of overlapping investors

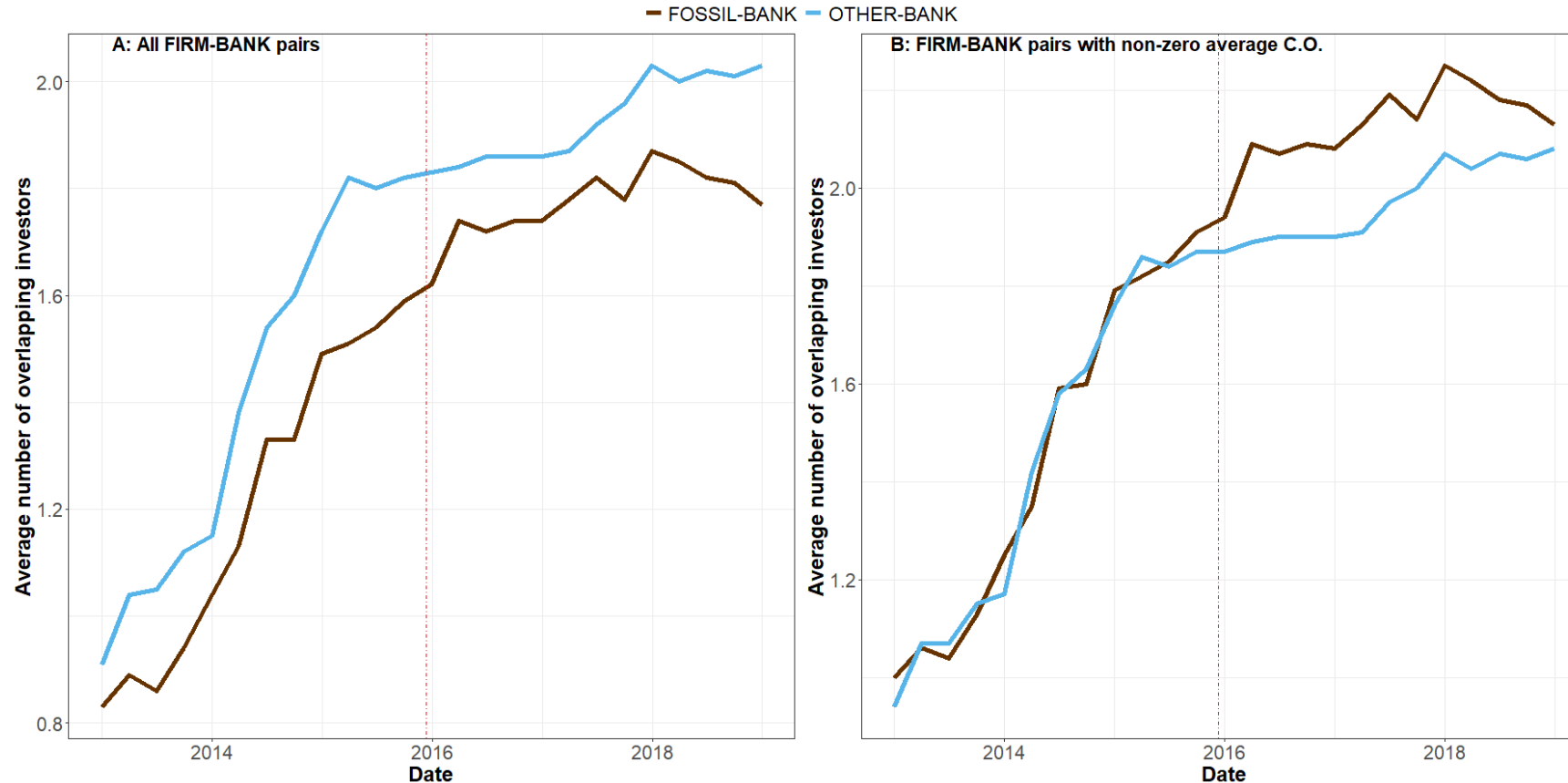


Figure 1: Average number of overlapping shareholders across firm-bank pairs at each date. Firms and banks are grouped by firm's climate risk into pairs of i) fossil fuel firms and banks (brown line), and ii) other sector firms and banks (blue line).

Panel A includes the full sample of entities (47 fossil fuel firms, 44 firms operating in other industrial sectors and 47 banks). Panel B includes only firm-bank pairs which do not consistently have zero common ownership.

Common ownership over time:

Average sum of shares held in banks by overlapping investors

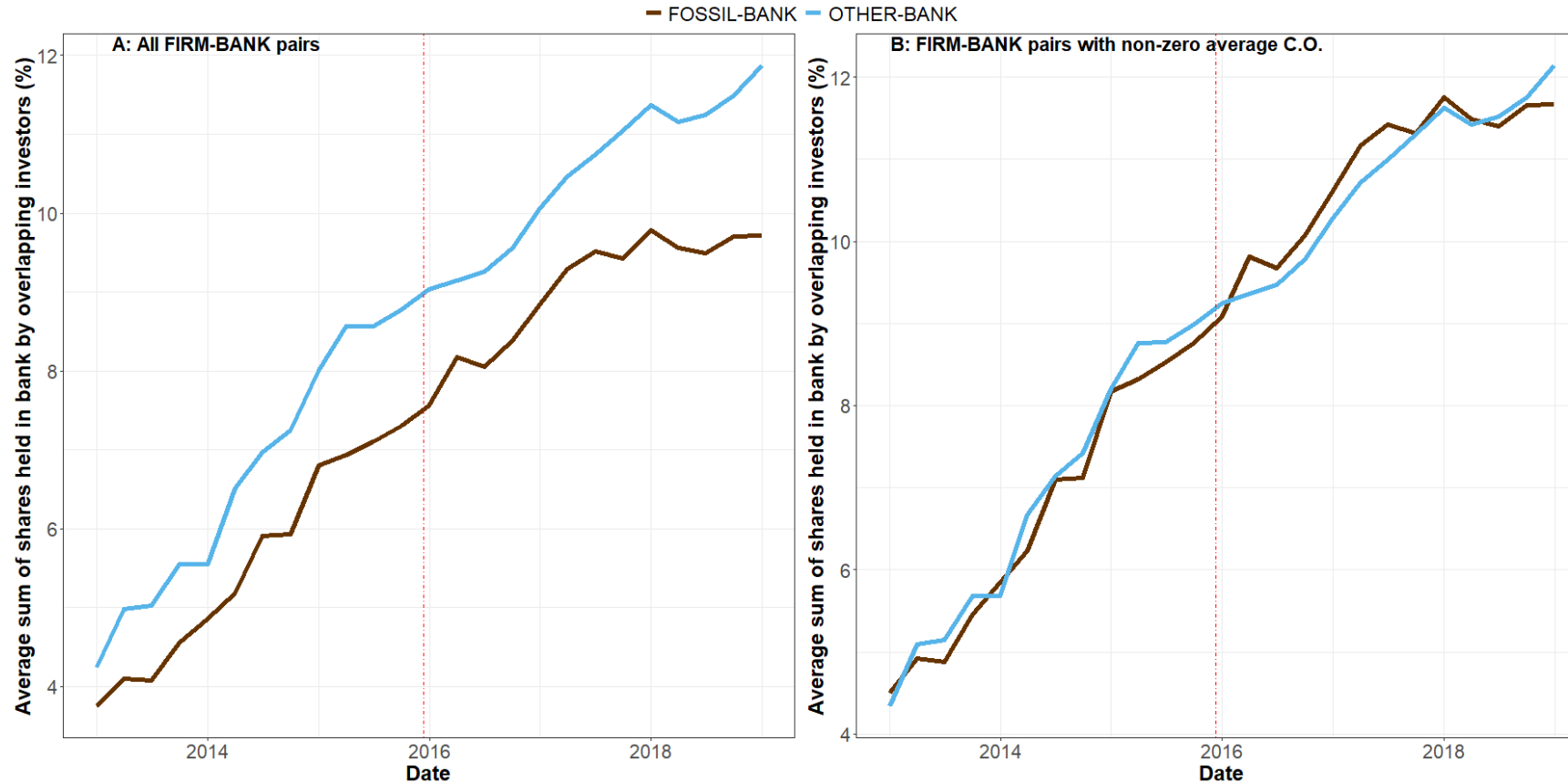


Figure 2: Average percentage of equity shares held in bank by overlapping shareholders across firm-bank pairs at each date. Firms and banks are grouped by firm's climate risk into pairs of i) fossil fuel firms and banks (brown line), and ii) other sector firms and banks (blue line). Panel A includes the full sample of entities (47 fossil fuel firms, 44 firms operating in other industrial sectors and 47 banks). Panel B includes only firm-bank pairs which do not consistently have zero common ownership.

Common ownership over time:

Average sum of shares held in firms by overlapping investors

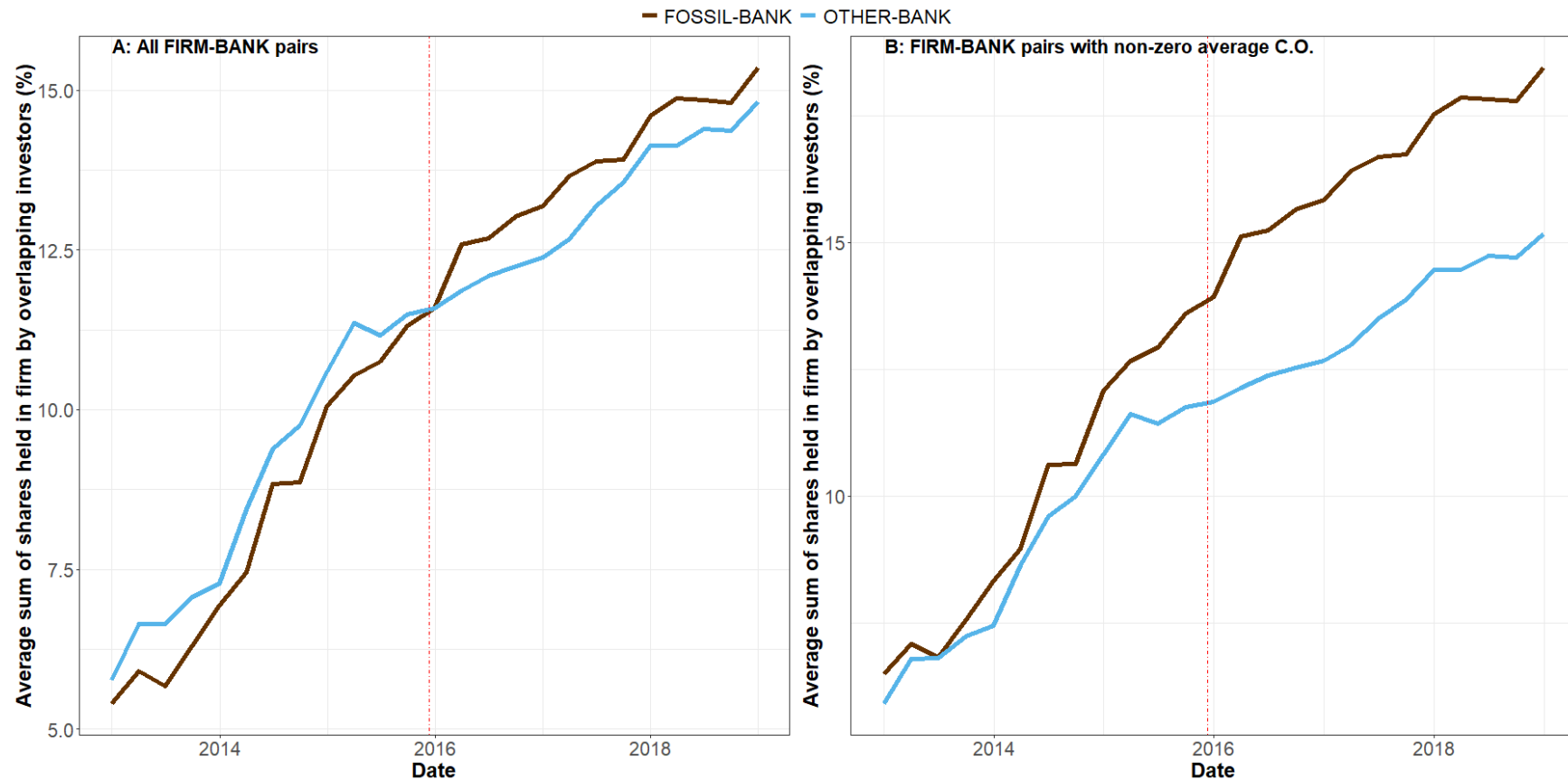


Figure 3: Average percentage of equity shares held in firm by overlapping shareholders across firm-bank pairs at each date. Firms and banks are grouped by firm's climate risk into pairs of i) fossil fuel firms and banks (brown line), and ii) other sector firms and banks (blue line). Panel A includes the full sample of entities (47 fossil fuel firms, 44 firms operating in other industrial sectors and 47 banks). Panel B includes only firm-bank pairs which do not consistently have zero common ownership.

Common ownership around the Paris Agreement

$$\Delta CO_{FB} = \beta_0 + \beta_1 FossilFuel + \beta_2 Controls_{FB} + \eta_{F,B} + \epsilon_{FB}.$$

- ΔCO_{FB} : difference between average CO measure in quarters before and after the Paris Agreement
- *FossilFuel*: dummy which takes value 1 for pairs of banks and fossil fuel firms
- $Controls_{F,B}$: level of CO before the Paris Agreement and a dummy for the presence of common ownership in a given bank-firm pair in at least one quarter
- $\eta_{F,B}$: sets of fixed effects for firms and banks

Estimation results

	Change in CO measure (after Paris - before Paris)		
	CO shares in bank	CO shares in firm	# overlapping investors
FossilFuel	0.796*** (0.097)	0.141 (0.196)	0.148*** (0.023)
Controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Firm & Bank fixed effects	Yes	Yes	Yes
Observations	4,277	4,277	4,277
Adjusted R ²	0.737	0.710	0.725
F Statistic	87.809***	76.732***	82.779***

*p<0.1; **p<0.05; ***p<0.01

Heteroskedasticity-robust standard errors are clustered by firms and banks.

Result: Increase in CO measures after the Paris Agreement is larger for banks-FF-pairs than for banks-other firms-pairs

Effects of common ownership between banks and firms on banks' lending to fossil fuel firms?

$$\begin{aligned} L_{i,t} = & \beta_0 + \beta_1 CO_{i,t-1} + \beta_2 FossilFuel + \beta_3 POST + \\ & \beta_4 CO_{i,t-1} * FossilFuel + \beta_5 CO_{i,t-1} * POST + \beta_6 FossilFuel * POST + \\ & \beta_7 CO_{i,t-1} * FossilFuel * POST + \\ & \beta_8 Controls_{i,t} + \beta_9 Controls_{borrower,t-4} + \eta_{i,year} + \epsilon_{i,t}. \end{aligned}$$

- $L_{i,t}$: loan variable (log of the total loan amount or all-in drawn spread over LIBOR (in bp))
- $FossilFuel$: dummy which takes value 1 for fossil fuel borrowers and 0 for other borrowers
- $POST$: dummy which takes value 1 after the Paris Agreement
- $CO_{i,t-1}$: CO between the lead lender(s) and the borrower measured in the quarter before the loan origination
- $Controls_{borrower,t-4}$: a set of borrower-related controls (size, leverage, ROA, age, PD) measured in the year before the loan origination
- $Controls_{i,t}$: a set of loan-related controls (loan maturity, total loan amount, number of lenders, and financial covenants dummy)
- $\eta_{i,year}$: loan type-, loan primary purpose- and year- fixed effects

Estimation results – loan amount

	Log total loan amount		
	(1)	(2)	(3)
CO shares in bank	0.064*** (0.015)	0.122*** (0.025)	0.110*** (0.027)
CO shares in firm	−0.030** (0.014)	−0.081*** (0.027)	−0.049** (0.025)
CO shares in bank * FossilFuel		−0.114* (0.059)	−0.158** (0.073)
CO shares in firm * FossilFuel		0.083** (0.039)	0.091 (0.062)
CO shares in bank * FossilFuel * POST			0.066 (0.091)
CO shares in firm * FossilFuel * POST			−0.002 (0.079)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Loan fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	398	398	398
Adjusted R ²	0.464	0.473	0.473
F Statistic	11.117***	10.626***	9.292***

*p<0.1; **p<0.05; ***p<0.01

Heteroskedasticity-robust standard errors are clustered by year.

Result: 1) CO increases loan amounts, but less so for fossil fuel firms 2) No different marginal impact after Paris Agreement

Estimation results – loan price

	Loan price: All-in drawn spread over LIBOR (bp)		
	(1)	(2)	(3)
CO shares in bank	−4.126*** (0.853)	−1.396 (1.584)	−0.005 (3.357)
CO shares in firm	3.567*** (1.344)	0.580 (1.868)	−1.730 (2.017)
CO shares in bank * FossilFuel		−4.310** (2.035)	−5.131* (2.868)
CO shares in firm * FossilFuel		4.070** (1.780)	5.019*** (1.738)
CO shares in bank * FossilFuel * POST			−3.227 (3.718)
CO shares in firm * FossilFuel * POST			2.065 (2.726)
Loan controls	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Loan fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	301	301	301
Adjusted R ²	0.527	0.531	0.582
F Statistic	11.465***	10.709***	8.194***

*p<0.1; **p<0.05; ***p<0.01

Heteroskedasticity-robust standard errors are clustered by year.

Result: 1) CO decreases loan rates, and more so for fossil fuel firms 2) No different marginal impact after Paris Agreeent

Conclusions

- CO between banks and fossil fuel firms increases more than CO between banks and other firms less exposed to climate risk, after the Paris Agreement
- CO affects the **terms** of syndicated loans
 - The **total amount of loan** increases with CO shares in banks
 - The effect is **less pronounced but still positive** in the case of **fossil fuel borrowers**
 - No marginally different effect of common ownership after the Paris Agreement for fossil fuel borrowers
 - The **price of loan** decreases with higher common investors' holdings in lenders
 - The effect is **more pronounced** in the case of **fossil fuel borrowers**
 - No marginally stronger effect of CO after the Paris Agreement for fossil fuel borrowers. However, CO significantly increased more for fossil fuel than for the other sector firms
- Investors' investments in banks may alleviate regulatory pressure on fossil fuel firms to decarbonize by offering loans at better terms