

# Green Indifference: Russian Banks' Treatment of Environmental Factors in Corporate Loan Pricing

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## Motivation

- **Climate agenda:** cross-border taxation (CBAM), reduction of  $CO_2$  emissions, adopting green technologies, green finance
- **Russia: current trends**
  - increasing attention from key regulators, firms and banks, but no “green” regulation (yet)
  - government: design of green transition, penalties for “brown” loans?
  - banks: rising role of the Big-4 state-owned banks in the 2010s

## Relation to the literature: green finance

- Following the 2015 Paris climate agreement, the literature has already established (internationally):
  - Firms' "brown" projects: from banks cheaper, from bond and equity markets expensive, [De Haas \(2023\)](#), [Beyene et al. \(2021\)](#)
  - "Green meets green" vs. banks financing brown firms' investment in CO<sub>2</sub> reduction, [Degryse et al. \(2023\)](#), [Kacperczyk & Peydro \(2021\)](#)

## Relation to the literature: government banking

- Government ownership of banks is largely inefficient, [La Porta et al. \(2002 JoF\)](#)
- But state banks smooth the credit cycles through supporting credits, [Bertay et al. \(2015 JBF\)](#)

## Relation to the literature: government banking & environmental issue

- State-backed policies can help to direct loans to environmentally sustainable firms, [Buchetti et al., 2024](#); [Erten and Ongena, 2023](#)
- But large state-owned banks may not fully account for transition risks, [Huang et al. 2021](#)

## Research Questions & Findings

- 1 Do banks already put markups on loans to climate unfriendly ('brown') firms, even before regulations?

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  - Maybe. We observe positive markups in all regressions, but they are too small to suggest a deliberate decision by banks to penalize 'brown' companies.
- 2 Given the growing influence of the state and focus on ESG factors, are large state-owned banks acting as early movers towards green finance?
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  - Unlikely. In all regressions, state banks tend to charge 'brown' firms less than big private banks.
- 3 Do banks value 'green' consciousness of their borrowers?

## Research Questions & Findings

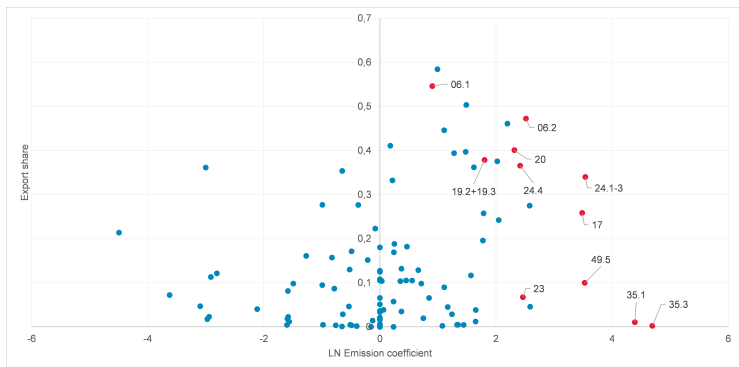
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- 3 Do banks value 'green' consciousness of their borrowers?
  - Not yet. The total amount of emission fee doesn't affect the interest rate.

**Part I:**  
**Industry-level data:**  
**fuel shares in costs and exporting status**

## Emissions data

- Energy consumption data in physical terms (tce) from the Rosstat 4-TER database ('Information on the use of fuel and energy resources') is a reliable source of data on CO<sub>2</sub> emissions from combustion on the industry level (≈90 OKVED-2 industries). Emissions estimations
- Industry-level data on fuel costs as a share of production costs: Rosstat 'Key Performance Indicators of Enterprises and Organizations' (1-predpriyatie) (≈2000 OKVED-2 industries)

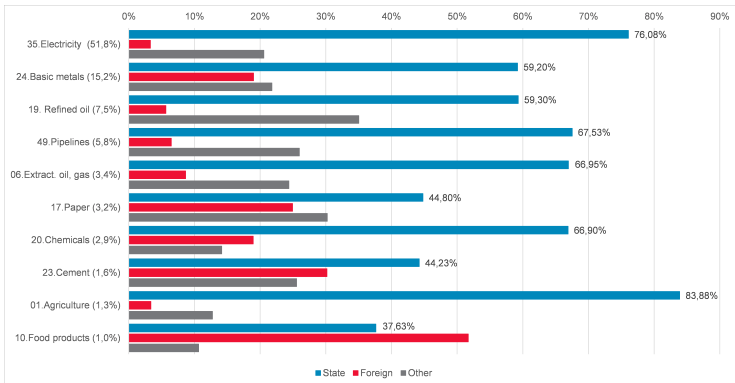
# Emissions and exports



- Cumulative emissions of 11 marked industries equals 85% of total  $CO_2$  emissions in 2019.

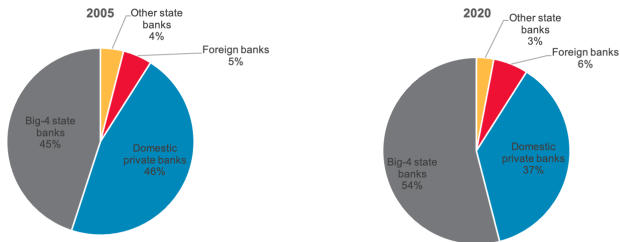
## “Brown” industries and banks

- Average share of new loans by type of a bank (state, foreign, other) in 2018-2021 for “brown” industries.



- Total CO<sub>2</sub> emissions of 10 industries on the graph above equals 94% (share in total emissions in 2018 in parentheses)

## Concentration of assets across bank ownership types





## **Part II: Firm-level data**

# Registry of Greenhouse Gas Emissions

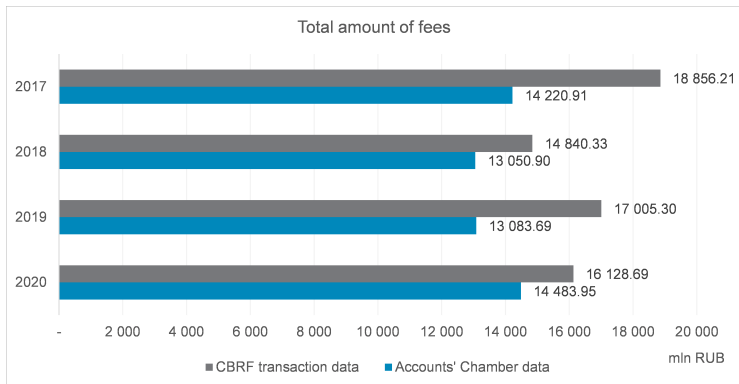
- Federal Law №296 On limiting greenhouse gas emissions: companies with an annual GHGs emission volume more than 150 thousand tons CO<sub>2</sub>e (scope 1) start reporting in 2023; in 2025 – reporting threshold decreases to 50 thousand tons CO<sub>2</sub>e.
  - Data is not publicly available.
  - Companies do not disclose registry data and instead prefer referencing their ESG reports.
  - Fines for late or non-submission of emissions reports effective from July 1, 2025 (No. 218-FZ of June 13, 2023): officials of regulated organizations: 10,000 to 50,000 rubles; individual entrepreneurs: 50,000 to 150,000 rubles; legal entities: 150,000 to 500,000 rubles.

# State Registry of Objects with Adverse Environmental Impact

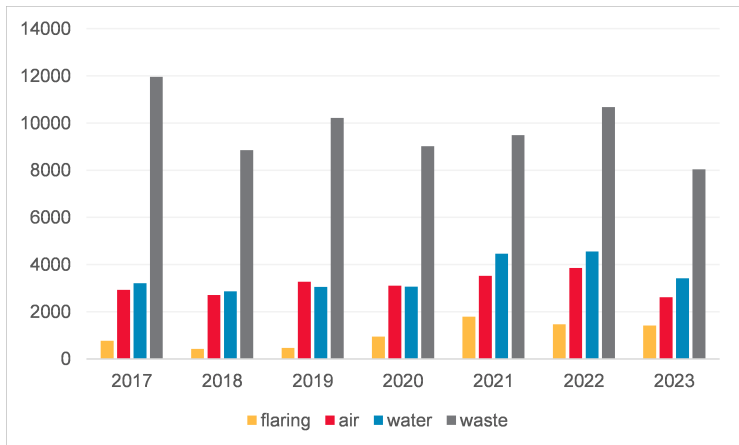
- Creation and upkeep of the registry are determined by:
  - the Articles 69 and 69.2 of Law No. 7-FZ “On Environmental Protection”
  - the government decree No. 830 dated May 7, 2022 “Rules Governing the Establishment and Maintenance of the State Registry of Objects with Adverse Environmental Impact”.
- The Registry, overseen by Rosprirodnadzor, holds information on emissions and discharges of harmful substances and GHGs that are considered harmful (in tonnes of  $CO_2$  equivalent). While updates are required annually, the data lacks a clear indication of the reference year.
  - 385 thousand objects (117 thousand - federal level, 268 - regional level), 39,000 firms with  $CO_2e > 0$

## Fees on emission of harmful substances

- Time frame: 2017-2022 yearly fees payed
- Fee category: flaring, air pollution, releases of harmful substances to water, waste disposal
- Total number of firms: 137 thousands (individual INN)



## Fees on emission of harmful substances



**Part III:**  
**Data, regression design, and draft results**

## Data for our research

- **Matched “bank-firm” data**

- The bank-firm credit register, 2017–2022 (The Bank of Russia's Form 303)
- Non-financial firms' balance sheets and P&L accounts, 2017–2022 (SPARK-Interfax database)
- Exclude subsidized loans according to Form 0409303 (Bank of Russia)
- Ratios and variables used in the analysis are trimmed for outliers (1 and 99 percentiles over a year and narrowly defined industries)
- Number of firms  $\sim$  273,000

# Variables in regression models 1

**Observation:** firm-bank relationship (credit) in report date  
( $y_{b,f,i,t}$ )

**Dependent variable:** average interest rate for new loans for firm  $f$   
in bank  $b$  in month  $t$

## Variables of interest:

- Emissions (proxy):
  - Share of fuel costs in total costs (industry level)
  - $CO_2$  equivalent kg per year / Sales (firm level)
  - Fees on emission of harmful substances (Air or Total) / Sales (firm level)
- Bank ownership and size (6 groups): 1) state, foreign, private; 2) big, other (by assets)
- Export share in industry sales (Rosstat's 1-predpriyatie database, years 2017-2022, industry classification matches fuel share data)



## Variables in regression models 2

### Control variables:

- Bank level: *bank*  $\times$  *month* fixed effects
- Firm level:
  - size (log of total assets)
  - leverage
  - ROA
  - age
  - productivity groups (leaders, laggards, followers)
  - industries' dummies (9 broad groups)
  - regions' dummies (8 federal districts)
- Loan level:
  - size (log of credit volume)
  - risk (5 credit quality groups)

# Estimation: descriptive statistics, 2017 – 2022

	Mean	Median	SD	Min	Max
<i>Loan level</i>					
Interest rate	11.47	11.83	4.50	0.01	35.40
log of loan volume	15.17	15.32	2.17	4.10	20.65
Quality group	1.85	2.00	0.54	1.00	5.00
<i>Industry level</i>					
Fuel share	0.04	0.02	0.08	0.00	1.00
Export share	0.02	0.001	0.06	0.00	1.00
<i>Bank ownership types</i>					
Big state banks ( <i>Big.STATE</i> )	0.39	0.00	0.49	0.00	1.00
Other state banks ( <i>Other.STATE</i> )	0.01	0.00	0.07	0.00	1.00
Big foreign banks ( <i>Big.FOREIGN</i> )	0.03	0.00	0.17	0.00	1.00
Other foreign banks ( <i>Other.FOREIGN</i> )	0.01	0.00	0.08	0.00	1.00
Big private banks (reference group)	0.41	0.00	0.42	0.00	1.00
Other private banks ( <i>Other.PRIVATE</i> )	0.15	0.00	0.36	0.00	1.00
<i>Firm level</i>					
log of total assets ( <i>Firm.Size</i> )	18.75	18.62	2.19	11.96	25.16
Age	10.95	10.00	6.56	2.00	30.00
Leverage	0.31	0.25	0.25	0.00	2.29
ROA	0.08	0.05	0.15	-1.73	1.15
Emission fees (Air) / Sales (%)	0.0002	0.00	0.002	0.00	0.06
Emission fees (Total) / Sales (%)	0.001	0.000	0.01	0.00	0.23
CO <sub>2</sub> equivalent / Sales (kg/RUB)	0.001	0.00	0.005	0.00	0.20

## Interest rate regressions, 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Fuel.Share}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Fuel.Share}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma \\ + \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

CO<sub>2</sub> and export

	Baseline (1)	+ Export (2)
Fuel.Share ( <i>industry-level</i> )	1.090*** (0.018) (0.117)	1.081*** (0.018) (0.117)
Export.Share ( <i>industry-level</i> )		0.902*** (0.122)
Obs	2,385,658	2,385,658
R <sup>2</sup> (adj.)	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

We find a positive price markup for CO<sub>2</sub> emission proxi  
But *on average* the markup is incredibly small, economically (standardized coefficients are in parentheses)

## Interest rate regressions, 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Fuel.Share}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Fuel.Share}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma \\ + \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

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Export.Share ( <i>industry-level</i> )		0.902*** (0.122)
Big.STATE × Fuel.Share	-1.862*** (0.140)	-1.869*** (0.140)
Other.STATE × Fuel.Share	-2.848*** (0.374)	-2.845*** (0.371)
Big.FOREIGN × Fuel.Share	-0.046 (0.546)	-0.051 (0.546)
Other.FOREIGN × Fuel.Share	-0.849 (0.930)	-0.859 (0.934)
Other.PRIVATE × Fuel.Share	-0.422** (0.190)	-0.440** (0.190)
Obs	2,385,658	2,385,658
R <sup>2</sup> (adj.)	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
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$$+ \left( \text{Fuel.Share}_{f(i)} \times \text{Export}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Theta$$

$$+ \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline	+ Export	+ Export × Bank.OWN
	(1)	(2)	(3)
Fuel.Share ( <i>industry-level</i> )	1.090*** (0.018) (0.117)	1.081** (0.018) (0.117)	1.051*** (0.018) (0.119)
Export.Share ( <i>industry-level</i> )		0.902*** (0.122)	0.550*** (0.241)
Big.STATE × Fuel.Share × Export			5.432*** (3.217)
Other.STATE × Fuel.Share × Export			44.487*** (22.608)
Big.FOREIGN × Fuel.Share × Export			23.489*** (7.766)
Other.FOREIGN × Fuel.Share × Export			-60.734 (37.420)
Other.PRIVATE × Fuel.Share × Export			7.999** (3.346)
Obs	2,385,658	2,385,658	2,385,658
R <sup>2</sup> (adj.)	0.634	0.634	0.634

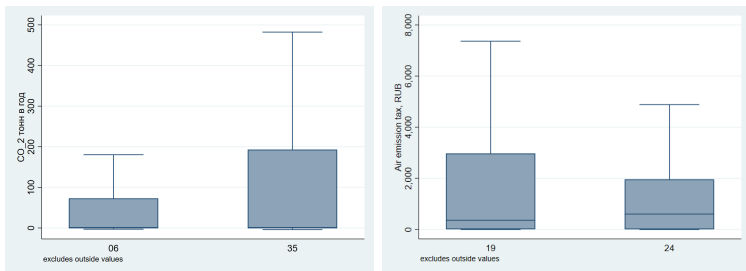
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 Clustered standard errors in parentheses. \*  $p < 0.1$ . \*\*  $p < 0.05$ . \*\*\*  $p < 0.01$

## Regression design: using micro data

- Poor data on 'green' status – as a result we have average industries' mark-ups. Try to use alternative emission data.
- 'Ideal' data: Registry of greenhouse gas emissions – data on  $CO_2$  emission on micro level
- Alternative data:
  - ① State registry of objects that have a negative impact on the environment (ONVOS, source: Rosprirodnadzor)
  - ② Payment data on emission fees (source: Bank of Russia)

# Regression design: using micro data

- Heterogeneity of emissions within an industry → use more granular data.



*Note:* 06 - Extraction of crude petroleum and natural gas, 19 – Manufacture of coke and refined petroleum products, 24 – Manufacture of basic metals, 35 – Electricity, gas, steam and air conditioning supply

# Interest rate regressions (“ONVOS” data), 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 CO_2.Eq_{f(i)} + \beta_2 Export_{f(i)} + \left( CO_2.Eq_{f(i)} \times Bank.OWNERSHIP_{b,t} \right)' \Gamma$$

$$+ Bank.OWNERSHIP'_{b,t} \Omega + \Psi_{b,t} + Firm.Control'_{f,t} \Phi + Loan.Control'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline (1)	+ Export (2)
$CO_2.Eq$ ( <i>firm-level</i> )	0.041 (3.009)	0.238 (3.011)
$Export.Share$ ( <i>industry-level</i> )		0.909*** (0.121)
$Big.STATE \times CO_2.Eq$	-5.844 (3.648)	-5.644 (3.636)
$Other.STATE \times CO_2.Eq$	15.152** (6.431)	14.932** (6.113)
$Big.FOREIGN \times CO_2.Eq$	-1.111 (14.337)	-0.305 (14.181)
$Other.FOREIGN \times CO_2.Eq$	-79.322** (36.676)	-78.185** (36.820)
$Other.PRIVATE \times CO_2.Eq$	6.093 (3.829)	6.291 (3.853)
Obs	2,381,783	2,381,783
$R^2$ (adj.)	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank*  $\times$  *month* fixed effects  
Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



# Interest rate regressions (“ONVOS” data), 2017 – 2022

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$$+ \left( CO_2.Eq_{f(i)} \times Export_{f(i)} \times Bank.OWNERSHIP_{b,t} \right)' \Theta$$

$$+ Bank.OWNERSHIP'_{b,t} \Omega + \Psi_{b,t} + Firm.Control'_{f,t} \Phi + Loan.Control'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	(1)	(2)	(3)
<i>CO<sub>2</sub>.Eq (firm-level)</i>	0.041 (3.009)	0.238 (3.011)	0.085 (3.185)
<i>Export.Share (industry-level)</i>		0.909*** (0.121)	0.772*** (0.186)
<i>Big.STATE × CO<sub>2</sub>.Eq × Export</i>			-12.045 (25.598)
<i>Other.STATE × CO<sub>2</sub>.Eq × Export</i>			76.367*** (37.346)
<i>Big.FOREIGN × CO<sub>2</sub>.Eq × Export</i>			1070.122*** (513.761)
<i>Other.FOREIGN × CO<sub>2</sub>.Eq × Export</i>			-1310.244*** (471.642)
<i>Other.PRIVATE × CO<sub>2</sub>.Eq × Export</i>			-35.308 (27.776)
Obs	2,381,783	2,381,783	2,381,783
R <sup>2</sup> (adj.)	0.634	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank × month* fixed effects  
 Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Interest rate regressions (Emission Fees (Air) data), 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{AirFee}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{AirFee}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma \\ + \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline (1)	+ Export (2)
AirFee ( <i>firm-level</i> )	23.374*** (0.008) (5.069)	23.218*** (0.008) (5.080)
Export.Share ( <i>industry-level</i> )		0.900*** (0.121)
Big.STATE × AirFee	-45.628*** (8.651)	-45.372*** (8.661)
Other.STATE × AirFee	-23.362 (22.395)	-25.095 (22.132)
Big.FOREIGN × AirFee	-75.600*** (25.768)	-74.635*** (25.611)
Other.FOREIGN × AirFee	-159.264*** (46.431)	-160.015** (46.675)
Other.PRIVATE × AirFee	-2.909 (7.946)	-2.918 (7.966)
Obs	2,382,025	2,382,025
R <sup>2</sup> (adj.)	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
 Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Interest rate regressions (Emission Fees (Air) data), 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{AirFee}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{AirFee}_{f(i)} \times \text{Bank.Ownership}_{b,t} \right)' \Gamma$$

$$+ \left( \text{AirFee}_{f(i)} \times \text{Export}_{f(i)} \times \text{Bank.Ownership}_{b,t} \right)' \Theta$$

$$+ \text{Bank.Ownership}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	(1)	(2)	(3)
AirFee ( <i>firm-level</i> )	23.374*** (0.008) (5.069)	23.218*** (0.008) (5.080)	26.263*** (0.008) (5.750)
Export.Share ( <i>industry-level</i> )		0.900*** (0.121)	0.794*** (0.186)
Big.STATE × AirFee × Export			33.951 (80.872)
Other.STATE × AirFee × Export			-35.532 (177.456)
Big.FOREIGN × AirFee × Export			176.839 (528.804)
Other.FOREIGN × AirFee × Export			-317.104 (301.269)
Other.PRIVATE × AirFee × Export			58.579 (108.059)
Obs	2,382,025	2,382,025	2,382,025
R <sup>2</sup> (adj.)	0.634	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
Clustered standard errors in parentheses. \**p* < 0.1, \*\**p* < 0.05, \*\*\**p* < 0.01

## Interest rate regressions (Emission Fees (All) data), 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Emission.Fee}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Emission.Fee}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma \\ + \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline (1)	+ Export (2)
Emission.Fee ( <i>firm-level</i> )	0.280 (1.276)	0.297 (1.276)
Export.Share ( <i>industry-level</i> )		0.904*** (0.121)
Big.STATE × Emission.Fee	-4.207** (1.663)	-4.203** (1.662)
Other.STATE × Emission.Fee	2.413 (6.364)	2.119 (6.313)
Big.FOREIGN × Emission.Fee	-14.150*** (4.735)	-14.104*** (4.742)
Other.FOREIGN × Emission.Fee	-4.699 (8.367)	-5.332 (8.078)
Other.PRIVATE × Emission.Fee	3.735** (1.651)	3.761** (1.652)
Obs	2,381,526	2,381,526
R <sup>2</sup> (adj.)	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Interest rate regressions (Emission Fees (All) data), 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Emission.Fee}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Emission.Fee}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma$$

$$+ \left( \text{Emission.Fee}_{f(i)} \times \text{Export}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Theta$$

$$+ \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	(1)	(2)	(3)
Emission.Fee ( <i>firm-level</i> )	0.280 (1.276)	0.297 (1.276)	0.032 (1.422)
Export.Share ( <i>industry-level</i> )		0.904*** (0.121)	0.766*** (0.188)
Big.STATE × Emission.Fee × Export			-6.698 (18.563)
Other.STATE × Emission.Fee × Export			45.395 (86.466)
Big.FOREIGN × Emission.Fee × Export			100.043** (42.949)
Other.FOREIGN × Emission.Fee × Export			155.985* (83.440)
Other.PRIVATE × Emission.Fee × Export			7.014 (24.264)
Obs	2,381,526	2,381,526	2,381,526
R <sup>2</sup> (adj.)	0.634	0.634	0.634

All regressions include firm-, and loan-level controls, and month and *bank* × *month* fixed effects  
Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Conclusions

- We find that, absent any “green” regulation in Russia, the Russian banks were imposing markups to the interest rates on loans for more polluting firms but those markups were materially insignificant.
  - For example, an increase in fuel share by one standard deviation will result in an expected increase in the interest rate of 0.081 p.p. ( $4.5 \times 0.018 = 0.081$ p.p., where 4.5 p.p. is the standard deviation of the interest rate variable).
- Largest markups were registered for big private domestic banks, lowest for state-held banks.
- We also do not see evidence that environmental status affects banks’ decisions on corporate interest rates as total value of payments for negative impact on the environment come insignificant in all specifications.

# Appendix

## CO<sub>2</sub> emissions from fuel combustion

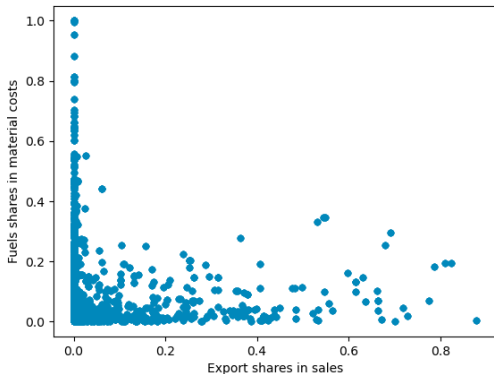
- Total emissions (without LULUCF) in 2018 equal 2,133,582 kt CO<sub>2</sub>e, emissions from combustion – 1,246,002 kt CO<sub>2</sub>e according National inventory report (NIR)
- Estimated industry emissions based on fuel consumption equal 1,214,867 kt CO<sub>2</sub>e (Rosstat 4-TER), which is 98% of categories 1-3 of Fuel consumption in NIR.

1. Energy	A. Fuel combustion	1. Energy industries	825 088,89	} 1 246 002,40 kt CO <sub>2</sub> e
		2. Manufacturing, construction	166 836,30	
		3. Transport	254 077,22	
		4. Other sectors (Residential)	207 834,50	
		5. Other	19 597,71	
	B. Fugitive emissions from fuels	205 798,81		
2. Industrial processes and product use		243 282,58		
3. Agriculture		112 824,98		
5. Waste		98 240,62		

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## Fuels and exports shares



Almost no correlation between share of fuels and share of exports

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# Disclosure Recommendations by the Bank of Russia

- Information Letter on Recommendations for Financial Organizations Regarding the Disclosure of Information in the Field of Sustainable Development (13.06.2023 No. IN-02-28/44)
  - Information on direct and indirect emissions of greenhouse gases (Scope 1, 2, 3)
- Information Letter on Recommendations for Public Joint-Stock Companies Regarding the Disclosure of Non-Financial Information Related to Their Activities (12.07.2021 No. IN-06-28/49)
  - The volume of greenhouse gas emissions by assets, broken down by industries, types of assets, and scopes 1, 2, and 3, along with the corresponding value of assets attributable to these categories, as of the end of the reporting period.

## CO<sub>2</sub> emissions and banks' portfolio



Average CO<sub>2</sub> emission in state banks' portfolio declines

[Go back to further steps](#)

## Control Variables, 2017 – 2022

	(1)	(2)
<i>Loan level</i>		
log of loan volume	-0.108*** (0.004)	-0.108*** (0.004)
Quality = 2	1.296*** (0.022)	1.296*** (0.022)
Quality = 3	1.576*** (0.036)	1.576*** (0.036)
Quality = 4	1.845*** (0.084)	1.844*** (0.084)
Quality = 5	-0.399*** (0.116)	-0.400*** (0.116)
<i>Firm level</i>		
Firm size	-0.527*** (0.007)	-0.527*** (0.007)
Leverage	-0.949*** (0.030)	-0.949*** (0.030)
ROA	-0.163*** (0.031)	-0.164*** (0.031)
Age	-0.200*** (0.007)	-0.200*** (0.007)
Followers	-0.013 (0.014)	-0.012 (0.014)
Laggards	-0.221*** (0.017)	-0.218*** (0.017)

Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Interest rate regressions, New borrowers 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Fuel.Share}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Fuel.Share}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma \\ + \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline (1)	+ Export (2)
Fuel.Share ( <i>industry-level</i> )	1.041*** (0.015) (0.145)	1.039*** (0.015) (0.145)
Export.Share ( <i>industry-level</i> )		0.881*** (0.155)
Obs	158,935	158,935
R <sup>2</sup> (adj.)	0.800	0.800

All regressions include firm-, and loan-level controls, and month fixed effects  
Clustered standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

We find a positive price markup for CO<sub>2</sub> emission for new borrowers

# Interest rate regressions, New borrowers 2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Fuel.Share}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Fuel.Share}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma$$

$$+ \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline (1)	+ Export (2)
Fuel.Share ( <i>industry-level</i> )	1.041*** (0.015) (0.145)	1.039*** (0.015) (0.145)
Export.Share ( <i>industry-level</i> )		0.881*** (0.155)
Big.STATE × Fuel.Share	-1.630*** (0.160)	-1.636*** (0.160)
Other.STATE × Fuel.Share	-1.926*** (0.575)	-1.904** (0.575)
Big.FOREIGN × Fuel.Share	-0.370 (0.760)	-0.369 (0.760)
Other.FOREIGN × Fuel.Share	0.403 (2.529)	0.382 (2.526)
Other.PRIVATE × Fuel.Share	-0.274 (0.292)	-0.281 (0.292)
Obs	158,935	158,935
R <sup>2</sup> (adj.)	0.800	0.800

# Interest rate regressions, New borrowers

2017 – 2022

$$r_{b,f,i,t}^L = \alpha_t + \beta_1 \text{Fuel.Share}_{f(i)} + \beta_2 \text{Export}_{f(i)} + \left( \text{Fuel.Share}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Gamma$$

$$+ \left( \text{Fuel.Share}_{f(i)} \times \text{Export}_{f(i)} \times \text{Bank.OWNERSHIP}_{b,t} \right)' \Theta$$

$$+ \text{Bank.OWNERSHIP}'_{b,t} \Omega + \Psi_{b,t} + \text{Firm.Control}'_{f,t} \Phi + \text{Loan.Control}'_{b,f,t} \Xi + \varepsilon_{b,f,i,t}$$

	Baseline	+ Export	+ Export × Bank.OWN
	(1)	(2)	(3)
Fuel.Share ( <i>industry-level</i> )	1.041*** (0.015) (0.145)	1.039*** (0.015) (0.145)	0.969*** (0.014) (0.146)
Export.Share ( <i>industry-level</i> )		0.881*** (0.155)	0.088 (0.309)
Big.STATE × Fuel.Share × Export			3.826 (4.129)
Other.STATE × Fuel.Share × Export			28.702 (46.888)
Big.FOREIGN × Fuel.Share × Export			-36.027 (34.159)
Other.FOREIGN × Fuel.Share × Export			177.807*** (62.560)
Other.PRIVATE × Fuel.Share × Export			5.000 (8.448)
Obs	158,935	158,935	158,935
R <sup>2</sup> (adj.)	0.800	0.800	0.800