### INCOMPLETE SUPERVISORY COVERAGE

# ANNUAL ECB BANKING SUPERVISION RESEARCH CONFERENCE

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### SUPERVISORY COOPERATION

The global banking landscape is dominated by large cross-border banks that operate in many countries

To contain risks at these banks, domestic supervisors frequently cooperate across countries

Such cooperation can take many different forms. It can range from joint supervision of banks to lighter forms of cooperation such as information exchange

Examples: In the Eurozone, the ECB acts as common supervisor for large banks. In Latin America, many countries have signed separate information exchange agreements with each other.





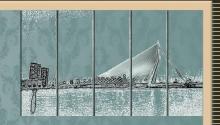
Cooperation agreements are predominantly at the country-level and cover only part of the global operations of banks.

#### REGULATORY ARBITRAGE

Cooperation between country A and B may make it more difficult for a banking group to take risks in these two countries. The group may thus shift risk into country C.

May explain why cooperation does not improve stability of the largest banking groups (Beck, Silva-Buston, Wagner, JFQA 2022)

### HOW DOES COOPERATION AFFECT SUPERVISION?



Theory (predominantly) predicts that cooperation makes supervision stricter:

- 1. Negative externalities from bank failures among A and B: Following cooperation, A and B should internalize these externalities, making stricter supervision optimal (Dell'Arricia and Marquez (2006), Niepmann and Schmidt-Eisenlohr (2013), Beck, Todorov, Wagner (2014), Calzolari, Colliard and Loranth (2018), and others)
- 2. Convergence to stricter standards: If A and B differ in their supervisory stringency, common standards following cooperation will be higher (Dell'Arricia and Marquez (2006), Kara (2016))
- 3. Supervision may also become more effective: Following cooperation between A and B, it is easier to detect risks taken by banks in A and B

Stricter and more effective supervision provide a motive for banking groups operating in A and B to shift risks into third countries.

### THIS PAPER



- 1. Incomplete coverage leads to third-country risk shifting
- 2. The presence of such risk-shifting affects the distribution of gains and costs across countries



### DATA

Hand-collected data on formal cooperation agreements between 93 countries home to a banking group and a larger set of potential subsidiary countries

Data covers 11.523 country-pairs over a period from 1995 to 2019 (updated from 2013)

We focus on the existence of a cooperation agreement

There is large variation in cooperation intensities across countries

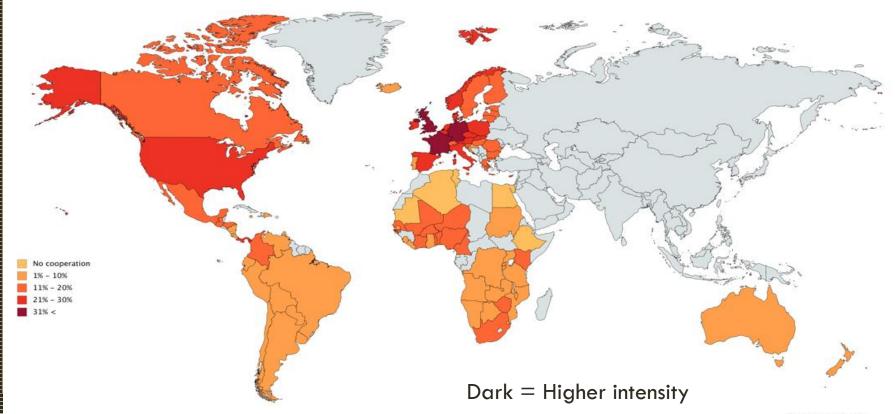
Banking sample: 119 banking groups with 676 subsidiaries, spanning 47 home countries and 116 host countries.

Coverage of actual banking groups is different!





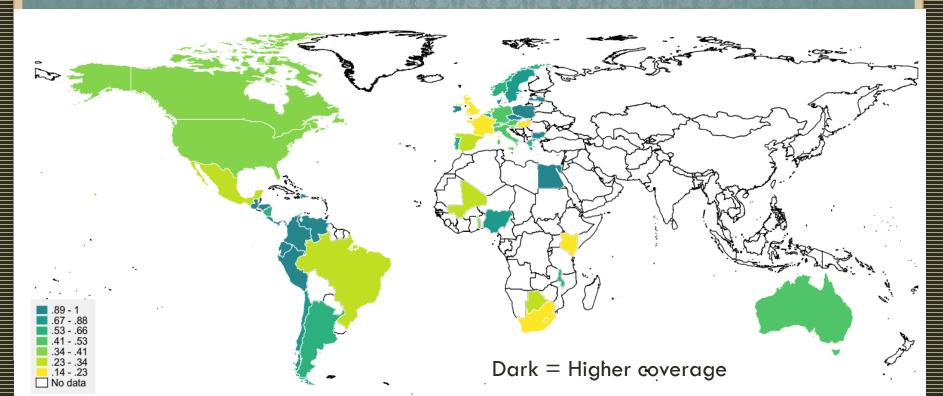
For each country, calculate fraction of other countries present in our dataset it cooperates with.



### COOPERATION "COVERAGE"



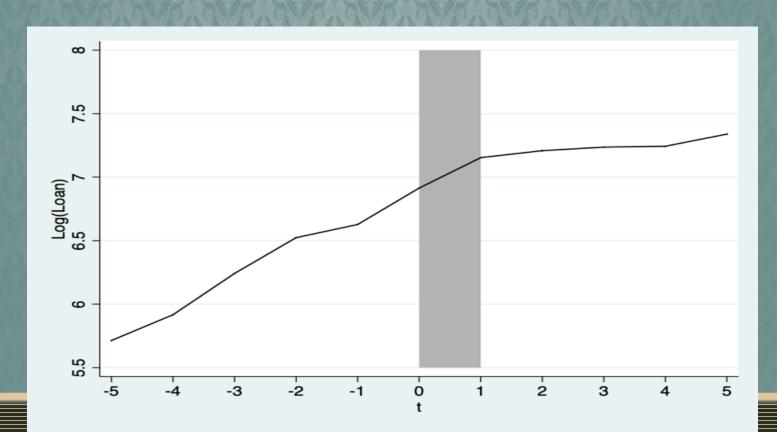
Consider all banking groups head-quartered in a country and calculate the fraction of (foreign) subsidiary operations covered by an agreement with the home country





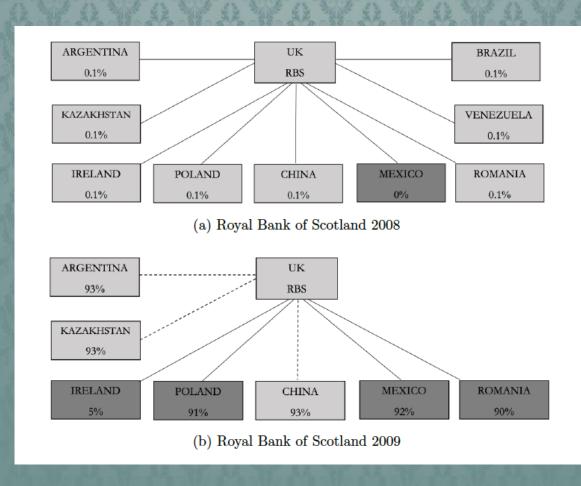
### COOPERATION "WORKS"

"Direct effect": Lending in a subsidiary slows when the host country signs an agreement with the home country





### EFFECT ON THIRD COUNTRIES?



Dark box = Cooperation with host-country



### EMPIRICAL SPECIFICATION

We examine how risk allocation into a specific subsidiary depends on cooperation coverage in the rest of group:

$$Log(Loans)_{s,g,c,p,t} = \beta_0 + \beta_1 Group \ coop_{g,c,t-1} + \beta_2 X_{s,t-1} + \gamma_s + \delta_{g,c} + \alpha_{c,p,t} + \epsilon_{s,g,c,p,t}$$

$$Group\ coop_{g,c,t} = \sum_{k \neq c} w_{g,k,t} \cdot Cooperation_{k,p,t} \qquad w_{g,k,t} = \frac{ForeignAssets_{g,k,t}}{\sum_{k \in K} ForeignAssets_{g,k,t}}$$

$$w_{g,k,t} = \frac{ForeignAssets_{g,k,t}}{\sum_{k \in K} ForeignAssets_{g,k,t}}$$

Group cooperation: Share of subsidiary countries of the banking group that have a cooperation agreement with the home country excluding the subsidiary itself.

Third-country setting allows controlling for parent-subsidiary country fixed effects (fully capture pull and push factors).

# LENDING SHIFTS INTO THIRD COUNTRIES...

Group coop. $g,c,t-1$	0.422*	0.434
	(0.218)	(0.214)
Subsidiary coop. $_{c,p,t-1}$		
$Log(assets)_{s,t-1}$	0.952***	0.976***
	(0.311)	(0.325)
Liquid assets/ $TA_{s,t-1}$	0.618	0.672*
	(0.372)	(0.362)
Capital ratio <sub>s,t-1</sub>	0.008	0.001
	(0.149)	(0.155)
Loan/Deposits <sub>s,t-1</sub>	3.362***	3.338***
	(0.908)	(0.918)
Non interest inc./ $TI_{s,t-1}$	-0.110	-0.106
	(0.071)	(0.073)
$LLP/TL_{s,t-1}$	-2.319**	-2.340*
-	(1.153)	(1.189)
Subsidiary FE	Y	Y
Host*Home*Year FE	Y	Y
Host*Group FE	N	Y
Observations	2056	2056
(within) R-squared	60%	60%



by 15%
following a one
standard
deviation
increase in
Group
Cooperation

### ...AND RISK INCREASES

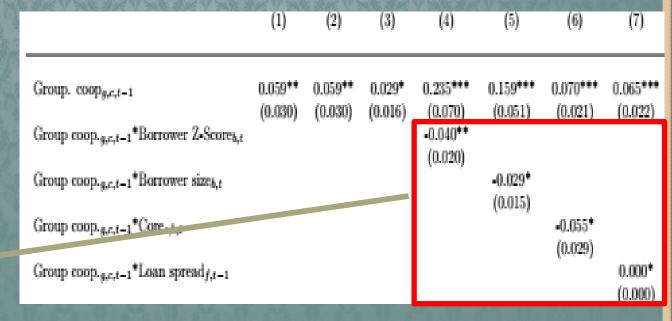
Dep. Var.:	Assets growth (1)	Equity growth (2)	Z-Score (3)
Group coop. $_{g,c,t-1}$	0.162*** (0.054)	-0.171** (0.080)	-51.224** (25.418)
$Log(assets)_{s,t=1}$	(0.004)	(0.042)	-04.328 (86.326)
Liquid assets/ $TA_{s,t-1}$	0.469** (0.228)	-0.298 (0.232)	21.098 (126.471)
Capital ratio $_{s,t-1}$	0.192***	-0.043	-221.231
Loan/Deposits $_{s,t-1}$	(0.067) 0.496***	(0.105) 0.744***	(228.145) -212.308
Non interest inc./ $TI_{s,t-1}$	(0.140) 0.042	(0.207) -0.202***	(195.387) -2.769
$LLP/TL_{s,t-1}$	(0.042) -0.830	(0.062) 3.431**	(68.548) -819.082
	(0.603)	(1.713)	(647.777)
Subsidiary FE	Y	Y	Y
Host*Home*Year FE	Y	Y	Y
Host*Group FE	Y	Y	Y
Observations	1566	1084	661
(within) R-squared	11%	17%	8%



### AT THE LOAN LEVEL?

We find consistent evidence for individual loans: Banking groups are more likely to originate a given (syndicated) loan through a subsidiary when residual Group Cooperation is high.

The effects are larger for ex-ante riskier loans, consistent with risk-shifting





EFFECTS ARE WEAKENED WHEN SUBSIDIARY **COUNTRY HAS** STRONG REGULATORY FRAMEWORK

Group coop. $_{g,c,t=1}$	0.438**	0.290	0.429*	0.598**
$\Delta$ Insolvency power <sub>g,c,t-1</sub>	(0.185) 1.295** (0.561)	(0.206)	(0.243)	(0.261)
Group coop. $g,c,t-1*\Delta$ Insolvency power $g,c,t-1$	-1.751***			
$\Delta$ Supervisory power <sub>g,c,t=1</sub>	(0.578)	-0.215		
Group coop. $_{g,c,t-1}$ * $\Delta$ Supervisory power $_{g,c,t-1}$		(0.375) -1.688**		
$\Delta$ Provision stringency <sub>g,c,t-1</sub>		(0.790)	-0.064	
Group coop. $_{g,c,t-1}$ * $\Delta$ Provision stringency $_{g,c,t-1}$			(0.721)	
			(1.023)	



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Group $coop{g,c,t-1}$	0.438** (0.185)	0.290 (0.206)	0.429* (0.243)	0.598** (0.261)
$\Delta$ Insolvency power <sub>g,c,t=1</sub>	1.295**	(0.200)	()	()
Group coop. $_{g,c,t-1}$ * $\Delta$ Insolvency power $_{g,c,t-1}$	(0.561) -1.751*** (0.578)			
$\Delta$ Supervisory power <sub>g,c,t-1</sub>	(0.010)	-0.215 (0.375)		
Group coop. <sub>q,c,t=1</sub> $*\Delta$ Supervisory power <sub>q,c,t=1</sub>		-1.688**		
$\Delta$ Provision stringency <sub>g,c,t-1</sub>		(0.790)	-0.064	
Group coop. <sub>g,c,t=1</sub> * $\Delta$ Provision stringency <sub>g,c,t=1</sub>			(0.721) -1.906* (1.023)	



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aroup coop, get=1 in tormon armgency get=1			(1.023)	

# RISK-SHIFTING AND SUPERVISORY "EFFECTIVENESS"



Risk-shifting into third countries has an interesting implication!

Supervisory cooperation between A and B is more effective in the sense of reducing risk for A and B if banking groups can shift risk to C

**Prediction** (generated from model): If A and B do not internalize the negative effect on C, they should be more likely to cooperate if risk-shifting opportunities are present for their banks

We empirically test this by amending a model of benefits and costs to bilateral cooperation (e.g., Dell'Arricia and Marquez (2006)) to include risk-shifting term.



### COOPERATION AND RISK-SHIFTING

Regress propensity of two countries to cooperate on proxy of risk-shifting opportunities and controls for other cooperation cost and benefits

Proxy for risk-shifting opportunities: Number of third countries in which banking groups active in A and B operate.

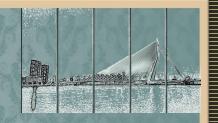
Risk shifting <sub>c,p,t-1</sub>	0.295** (0.136)
Bilateral share <sub>c,p,t-1</sub>	1.204*** (0.261)
Host x Home FE	Y
Year FE Observations (within) R-squared	Y 289 7%

Result: When supervision is more effective to country A and B (because banks can relocate risk elsewhere), country A and B are more likely to cooperate

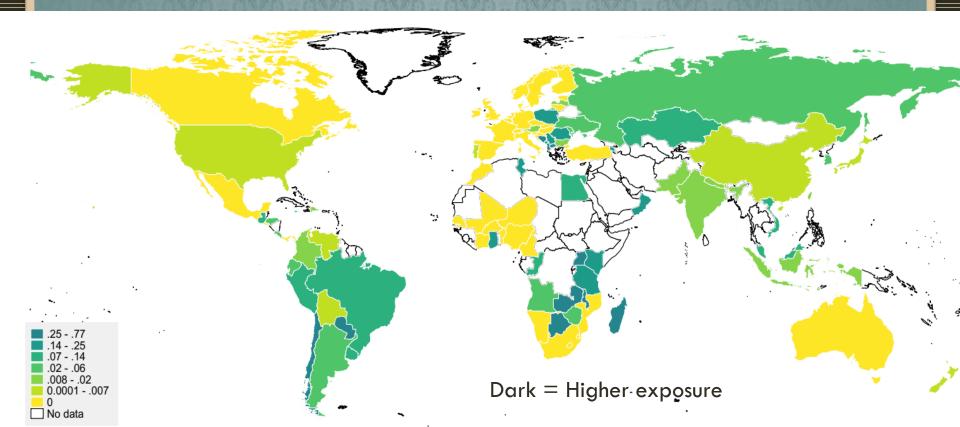
Points to a source of inefficiency in cooperation decisions as the gain to A and B is a cost to C!

WOLF WAGNER ECONOMICS, SESSION 7





The figure presents an index of how exposed a country is to risk-shifting from other countries. It is calculated as the average cooperation coverage (Group cooperation) of all foreign subsidiaries present in the country.







Incomplete coverage of cooperation agreements leads to risk-shifting into third countries

This undermines the global effectiveness of actual cooperation agreements

When set of countries contemplating cooperation differs significantly from the footprint of banks, incentives to cooperate may be distorted as cooperation costs fall on third-countries

Policy implication: Seek multilateral approaches!

### THANK YOU





	N	mean	sd	p25	p50	p75
Log(loans)	1,508	6.957	1.904	5.696	6.859	8.275
Group cooperation	1,508	0.509	0.348	0.184	0.559	0.855
Subsidiary cooperation	1,508	0.5	0.5001	0	0.5	1
Home cooperation	1,508	0.151	0.087	0.080	0.145	0.210
EW Group cooperation	1,508	0.435	0.267	0.25	0.5	0.625
Other subsidiaries cooperation	1171	0.290	0.319	0	0.157	0.561
Log(assets)	1,508	7.707	1.829	6.420	7.592	8.985
Liquid assets/TA	1,508	0.268	0.190	0.126	0.220	0.374
Capital ratio	1,508	19.146	14.479	12.61	15.7	20.035
Loan/Deposits	1,508	0.516	0.224	0.367	0.542	0.679
Non interest inc./TI	1,508	0.308	0.218	0.162	0.273	0.404
LLP/TL	1,508	0.016	0.024	0.002	0.009	0.020
Assets growth	1085	0.076	0.240	-0.037	0.065	0.188
Equity growth	1084	0.099	0.267	-0.020	0.083	0.200
RÔE	1083	0.075	0.175	0.028	0.091	0.158
SD(ROE)	663	0.087	0.210	0.019	0.035	0.076
$\Delta$ Insolvency power	1460	0.147	0.235	-0.004	0.156	0.298
$\Delta$ Supervisory power	1441	0.228	0.239	0.068	0.195	0.353
$\Delta$ Provision stringency	1249	0.279	0.219	0.139	0.300	0.457
$\Delta$ Size DI	983	0.024	0.120	-0.003	0.002	0.009



### TYPES OF AGREEMENTS

Memorandum of Understanding for information sharing (29%)

College of Supervisors (31%)

Memorandum of Understanding on crisis management and resolution (10%)

Supranational supervisor (30%)



### COUNTRY-LEVEL IMPLICATIONS

Does economic significance at the level of a foreign subsidiary, translate to the country-level?

=> Aggregate all subsidiaries in a host countries and calculate implied effect using estimate from subsidiary-level regressions

Economic size: One-standard deviation change in group cooperation increases foreign loans (expressed as share of total loans in the country) by 18%

# RESULTS CONFIRMED ON THE EXTENSIVE MARGIN



 $Y_{g,c,p,t} = \beta_0 + \beta_1 Group \ coop_{g,c,t-1} + \beta_2 X_{g,c,t-1} + \gamma_{g,c} + \alpha_{c,p,t} + \epsilon_{g,c,p,t}$ 

	(1)	(0)	(2)
	$\mathbf{T}$ (1)	(2)	(3)
	Log(loans)	Asset growth	$\Delta Subsidiaries$
Commence	0.410***	0.150***	0.001*
Group $coop{t-1}$	0.416***	0.172***	0.261*
	(0.114)	(0.0530)	(0.154)
$Log(assets)_{t-1}$	1.191***		0.117
	(0.296)		(0.0732)
Liquid assets/ $TA_{t-1}$	0.0929	0.414	[0.0672]
,	(0.192)	(0.261)	(0.284)
Capital ratio $_{t-1}$	-0.00713	0.00133	0.00503***
	(0.00653)	(0.00122)	(0.00165)
$Loan/Deposits_{t-1}$	0.570***	` 0.190 ´	-0.202*
	(0.110)	(0.155)	(0.118)
Non interest inc./TI $_{t-1}$	-0.126	0.241	0.000589
	(0.212)	(0.152)	(0.0606)
$LLP/TL_{t-1}$	-1.306	-0.779	-1.090
· ·	(1.537)	(0.788)	(0.672)
Host x Group FE	$\mathbf{Y}$	$\mathbf{Y}$	Y
Host x Home x Year FE	$\mathbf{Y}$	Y	Y
Observations	1,049	1,049	1,049
R-squared	0.63	0.17	0.09