Banks' size, scope and systemic risk:
What role for conflicts of interest?

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Size and scope expansion

▸ Deregulation, technological progress, financial innovation
   ◦ Change in bank business models
   ◦ Impact on performance, customers, idiosyncratic risk
   ◦ (Perceived as) important contributors to financial crisis

▸ Theoretical and empirical evidence on impact of:
   1. <u>Non-Interest Income</u> (scope) on Systemic Risk
      - Brunnermeier et al. (2012), Engle et al. (2013), De Jonghe (2010)
      - Wagner (2010), Ibragimov et al. (2011), Boot and Ratnovski (2013)

   2. <u>Size</u> on Systemic Risk
      - TMTM
      - related to interconnectedness, (information) contagion, correlated exposures, herding and implicit guarantees

   Combined impact?!?
   Additive vs. Multiplicative effects ?

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This paper...

- Examines <u>joint and interactive impact</u> of size and scope on systemic risk

- Shows empirically that an increase in non-interest income activities:
  - <u>increases small</u> banks' exposure to systemic risk,
  - while it <u>reduces</u> systemic risk exposure for medium/large banks
    - Surviving a battery of robustness checks

- Argues that size affects the trade-off between a dark and bright side of scope expansion

- Shows that this bright side of diversification for large banks crucially depends on <u>the information and institutional environment</u> in which banks operate
  - Exploiting cross-country variation

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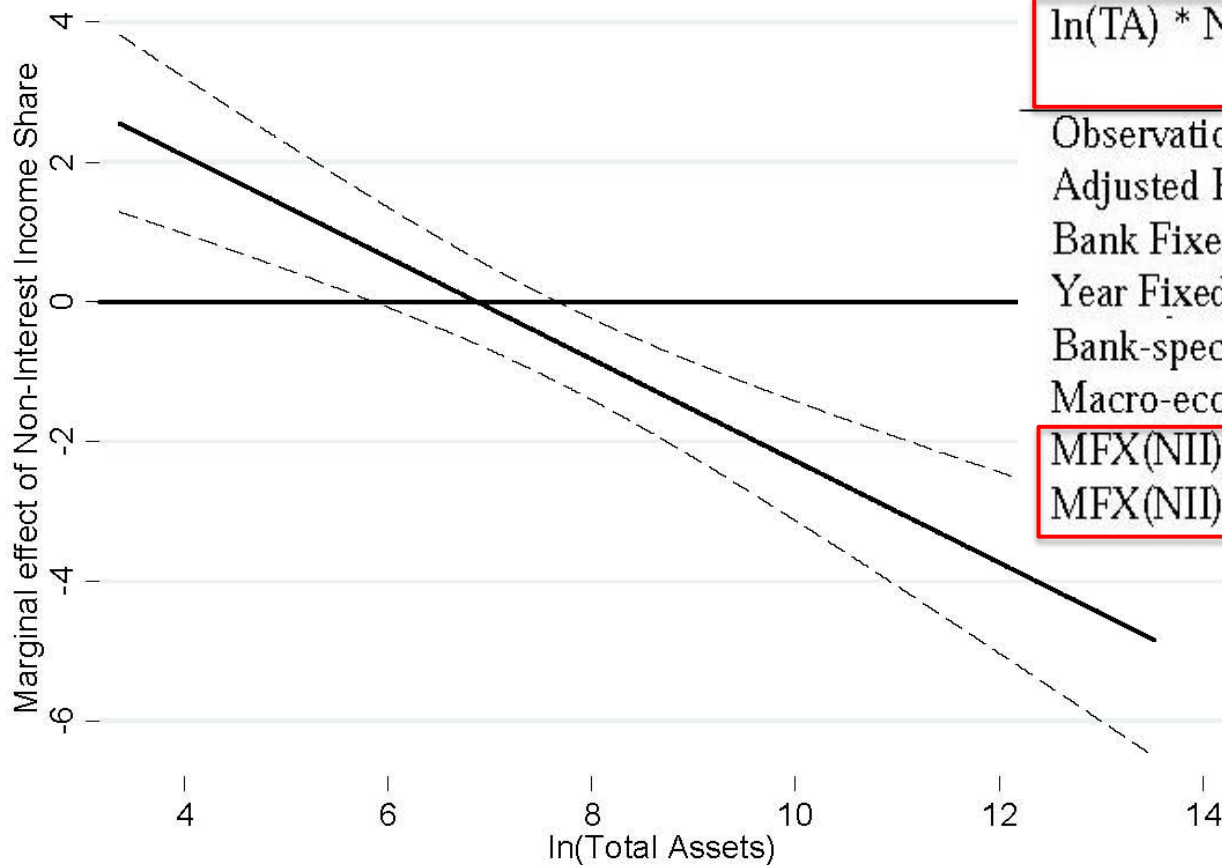
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Sample and Measures

▸ (De)Listed banks across the globe, 1997-2011

▸ Independent variables of interest
  ◦ Bank Size: ln(Total Assets)
  ◦ Non-interest income share

▸ Systemic risk: Marginal expected shortfall
  ◦ (Acharya et al, 2010)

$$MES_{i,t}(Q) = E[R_{i,t}|R_{m,t} < VaR_{m,t}^{Q}]$$
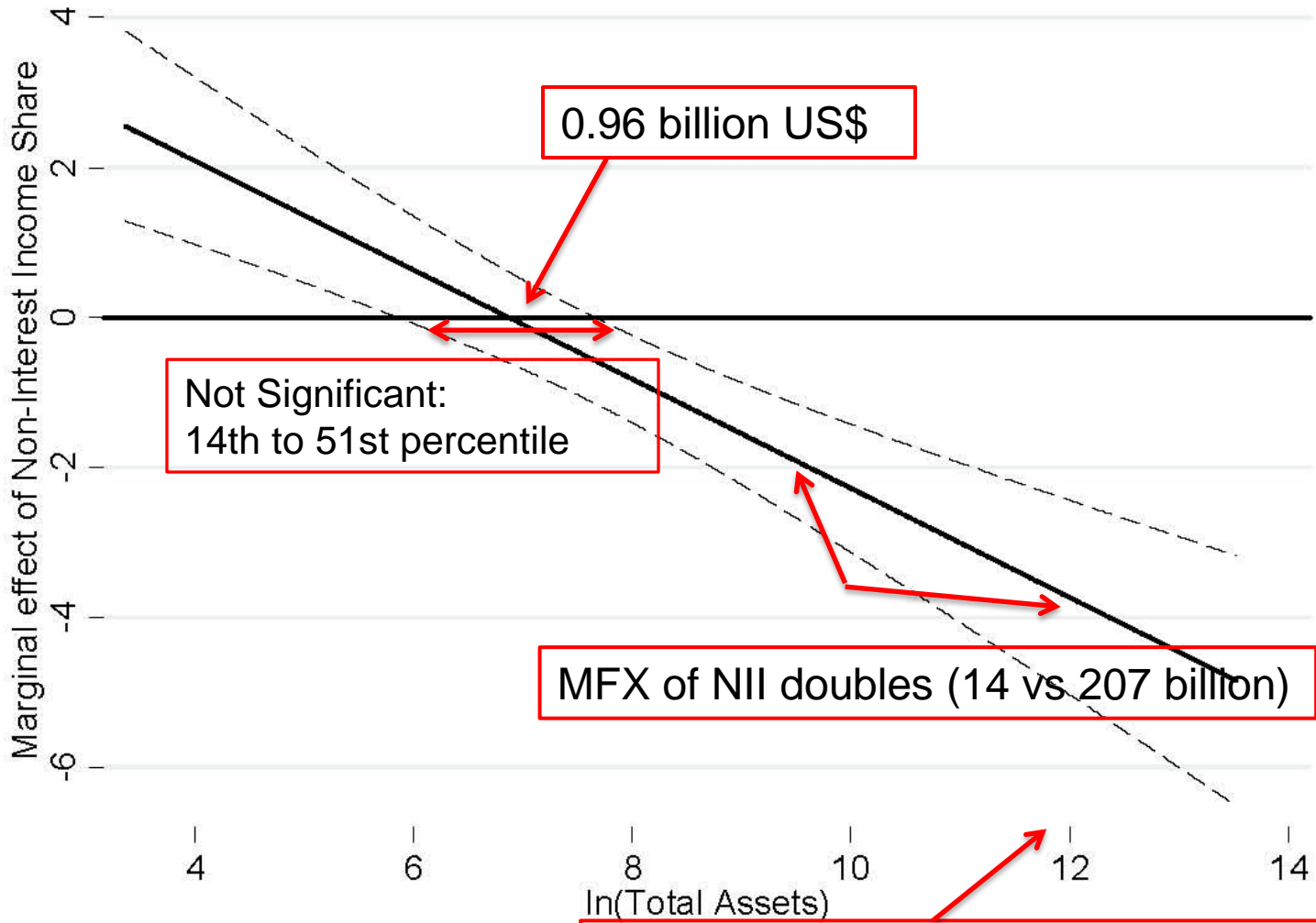
Interaction effect: sign and significance

$$MES_{i,t}(Q) = E[R_{i,t}|R_{m,t} < VaR_{m,t}^Q]$$

→ Opposite of this measure

VARIABLES	F.MES
Ln(Total assets)	0.994***
	(0.095)
Non-Interest Income Share	5.001***
	(1.071)
ln(TA) * Non-Interest Income Share	?
Observations	16507
Adjusted R-squared	0.570
Bank Fixed Effects	YES
Year Fixed Effects	YES
Bank-specific Controls	YES
Macro-economic variables	YES
MFX(NII)=0 for lnTA	
MFX(NII)=0 for TA	

Economic Magnitudes: baseline

0.96 billion US$

Not Significant:
14th to 51st percentile

MFX of NII doubles (14 vs 207 billion)

One st.dev increase in NII leads to decrease of MES of 27.5%

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US only (CRSP, FRY9C)

FRY9C: detailed breakdown of non-interest income

Two approaches:

- Volatile versus Stable

  (Calomiris and Nissim)

- Fee from traditional vs. fee from services vs. stakeholder income

  (DeYoung and Torna)

VARIABLES	MES	MES	MES
Ln(Total Assets)	0.994***	0.972***	1.879***
	(0.057)	(0.058)	(0.119)
Non-Interest Income Share	6.182***		
	(1.160)		
Ln(TA)*Non-Interest Income Share	-0.863***		
	(0.136)		
Volatile Non-Interest Income		4.600**	
		(2.112)	
Ln(TA)*Volatile Non-Interest Income		-0.658***	
		(0.250)	
Stable Non-Interest Income		6.199***	
		(1.380)	
Ln(TA)*Stable Non-Interest Income		-0.837***	
		(0.160)	
Traditional Fee Income			0.186***
			(0.048)
Ln(TA)*Traditional Fee Income			-0.027***
			(0.005)
Fee for Services Income			0.920**
			(0.385)
Ln(TA)*Fee for Services Income			-0.096**
			(0.038)
Stakeholder Income			0.427**
			(0.190)
Ln(TA)*Stakeholder Income			-0.053***
			(0.018)
Constant	-3.243***	-4.211***	-14.652***
	(0.948)	(0.740)	(1.398)
Observations	3,973	3,972	1,540
Adjusted R-squared	0.687	0.682	0.623
Bank Fixed Effects	NO	NO	NO
Year Fixed Effects	YES	YES	YES
Between Estimator	YES	YES	YES
Clustered SE	Bank	Bank	Bank

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What theory tells us...

- Bright side vs. Dark side of scope expansion/diversification

  (+) Risk reduction within FI / risk sharing within system

  (-) Increased complexity

  (-) Conflicts of interest

- Diversification for small banks: *dark side dominates*

  - *More opaque, more asymmetric / private information (-),*

  - *Lack the skill to deal with innovation (-)*

- *Dark becomes grey/bright,* the larger the bank:

  - *Risk diversification benefits of Financial Innovation (+)*

  - *Economies of scale in risk management (+)*

  - *Subject to larger scrutiny by several stakeholders (+)*

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Bright side of Financial innovation

… for large banks should turn grey or dark if <u>scope for disciplining is low</u> (Saunders and Cornett, Mehran and Stulz):
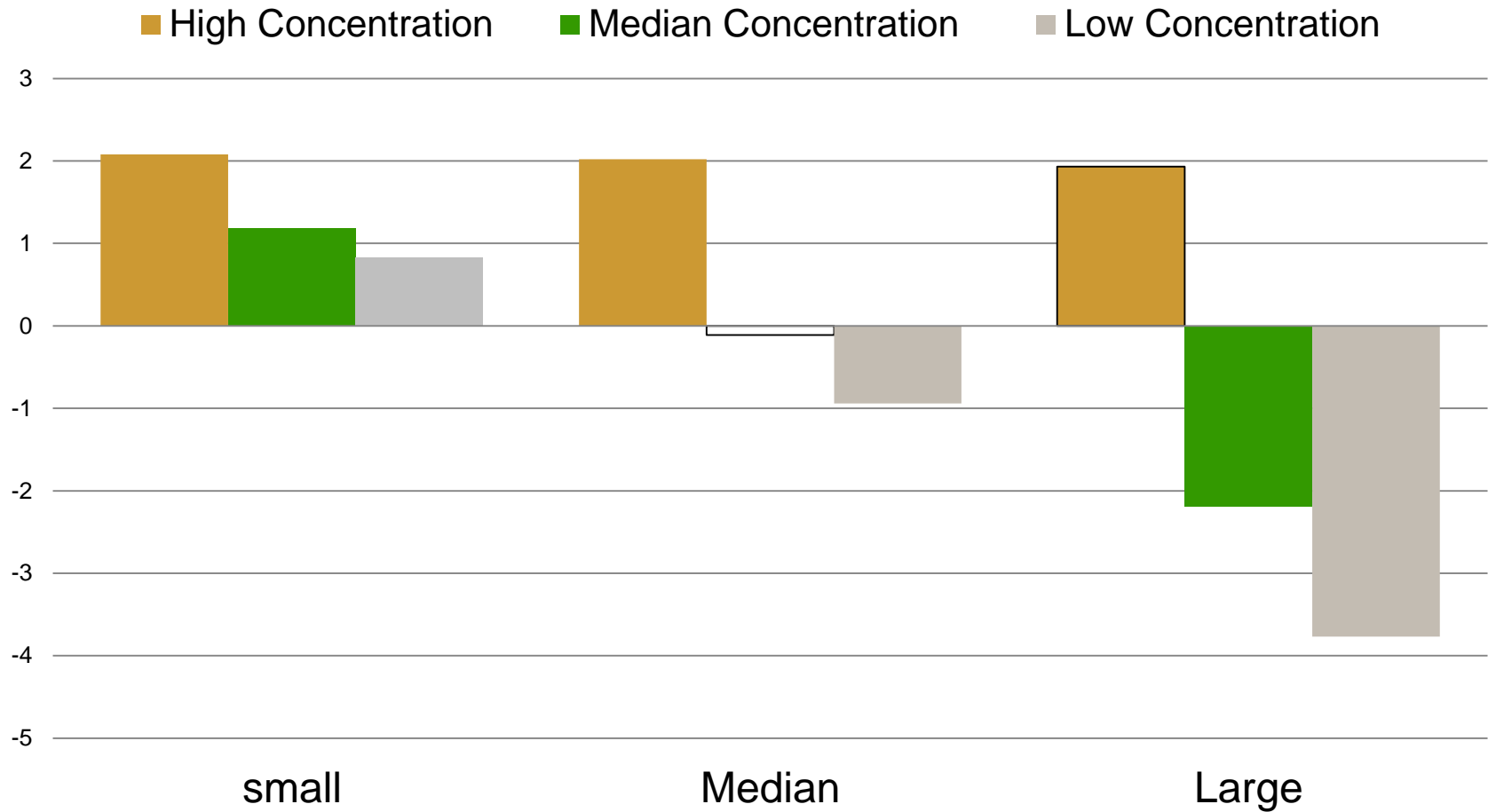
1. Imperfect or asymmetric information about banks

2. More private information by banks

3. Low value on reputation

4. Concentration (TINA)

   (i.e. 'no need to care' environment)

▸ Empirical proxies that vary over countries (and time)

▸ Using triple interactions we find that marginal effect of NII on MES:
   ◦ does not depend on size if scope for disciplining is low
   ◦ does depend on size (with sign switch) if scope for disciplining is high

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Concentration

Impact of NII on MES

Information Sharing

Impact of NII on MES

- Low Depth of Information Sharing
- Median Depth of Information Sharing
- High Depth of Information Sharing

small banks   Median banks   Large banks
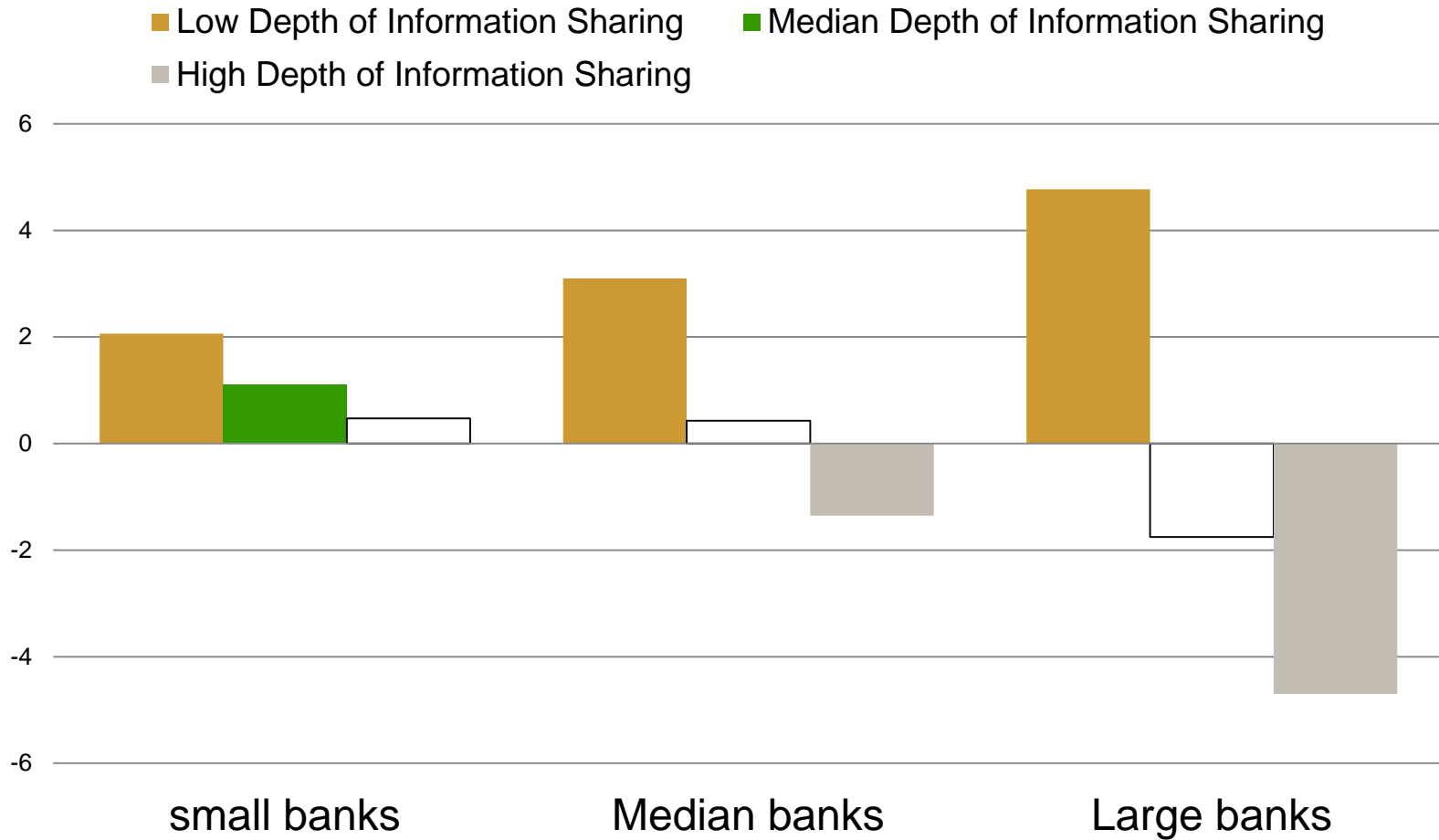
Implications and Contributions

1. **<u>Academic point of view</u>**

- Relationship between diversification and systemic risk

    - Offer an explanation for the heterogeneous results across samples of (i) large and small banks; and (ii) different countries

- Role for conflicts of interest between different business lines

    - Between country approach, rather than within bank

2. **<u>Policy perspective</u>**

- Downsizing: positive direct and indirect (less concentration) impact on systemic risk

- Improve information disclosure (transparency) rather than general ring-fencing

- One-size-fits-all approach to (activities) regulation?

    - E.g.: trading (US), ring-fencing (UK), or a combination (EU)

    - Within a country: literally, size differences

    - Across countries: e.g. EU approach

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THANK YOU

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Summary Statistics

Variable	Mean	Standard Deviation	5th Percentile	Median	95th Percentile
Bank Variables					
Marginal Expected Shortfall	1.924	2.354	-0.435	1.323	6.550
Ln(Total assets)	8.004	2.078	5.153	7.638	11.972
Non-Interest Income Share	0.186	0.141	0.033	0.158	0.435
Capital-to-Assets Ratio	9.565	5.969	3.870	8.650	17.500
Share of Deposit Funding	0.924	0.128	0.709	0.969	1.000
Loans to Total Assets	0.623	0.159	0.325	0.647	0.842
Return-on-Equity	8.274	15.389	-14.910	10.240	24.610
Annual Growth in Total Assets	0.096	0.212	-0.142	0.059	0.441
Credit Risk	0.192	0.321	0.000	0.098	0.690
Commercial Bank Dummy	0.445	0.497	0	0	1
Bank Holding Company Dummy	0.510	0.500	0	1	1
Savings Bank Dummy	0.022	0.147	0	0	0
Cooperative Bank Dummy	0.023	0.151	0	0	0
Country Variables					
GDP per Capita	8.83	1.356	6.237	9	10.518
GDP Growth - Annual	3.531	3.666	-2.75	3.75	8.9
CPI	4.637	7.951	0	2.64	13.59
Depth of Information Sharing	4.012	1.788	0	4	6
Private Monitoring	8.232	1.382	6	8	10
Freedom from Corruption	54.839	24.328	22	50	93
HHI	0.208	0.159	0.048	0.159	0.555

The baseline: Robustness

1. **Methodology:**
   - Bank fixed effects versus country fixed effects
   - <u>IV estimation :</u> Cost ratio

2. **Alternative LHS**
   - Winsorized or not; Including bank in index, Arithmetic returns, two day returns
   - Worldwide MES, <u>Total Volatility</u>, weekly MES
   - <u>Systemic risk :</u> CoVaR

3. <u>**Subcomponents of non-interest income**</u>
   - Commission and fee; trading; other operating income
   - <u>Volatile or not; traditional and non-traditional fee</u>

4. **Control variables:**
   - Orthogonalized size or not; No control variables; expansion into non-interest income, MTB, TV, TBTF banks,…

5. **Alternative samples:**
   - <u>Only commercial banks, only BHCs,</u>
   - Excluding fast growing banks (M&As), excluding (distressed) exits
   - Pre and post-crisis, US versus ROW

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Exploit cross-country variation

Marginal Effects								
Depth of Information Sharing								
	Low		Median		High		High-Low	
Small banks	2.061	.031	1.108	.012	.472	.375	-1.589	.182
Median bank	3.107	0	.432	.201	-1.352	0	-4.458	0
Large banks	4.778	.004	-.648	.334	-4.266	0	-9.043	0
Large-Small	2.717	.202	-1.756	.044	-4.738	0		

Private Monitoring								
	Low		Median		High		High-Low	
Small banks	1.103	.135	1.184	.017	1.265	.006	.162	.823
Median bank	.591	.268	-.253	.471	-1.097	.001	-1.689	.003
Large banks	-.226	.818	-2.549	0	-4.871	0	-4.646	0
Large-Small	-1.329	.317	-3.733	0	-6.136	0		

Freedom from Corruption								
	Low		Median		High		High-Low	
Small banks	.909	.245	.896	.071	.876	.097	-.034	.973
Median bank	.208	.684	-.246	.448	-.974	.019	-1.182	.099
Large banks	-.913	.402	-2.073	.001	-3.928	0	-3.016	.078
Large-Small	-1.822	.241	-2.969	.001	-4.804	0		

HHI								
	Low		Median		High		High-Low	
Small banks	.832	.082	1.179	.004	2.086	0	1.254	.061
Median bank	-.941	.004	-.119	.689	2.026	.001	2.967	0
Large banks	-3.773	0	-2.193	0	1.93	.119	5.703	0
Large-Small	-4.605	0	-3.372	0	-.156	.91		

"Placebo" tests on triple interactions: other factors

- Regulation:

    - Deposit Insurance

    - Herding

    - Activity Restrictions

- Macro-economic conditions

    - Crisis/No-Crisis

    - Real Interest Rate

- Financial market development (stocks and bonds)

    ... do not lead to reversals or insignificance

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VARIABLES	(1) F.MES	(2) F.MES	(3) F.MES	(4) F.MES	(6) F.MES	(5) F.MES
Ln(Total assets)	0.732***	1.105***	1.091***	0.747***	0.885***	0.331*
	(0.147)	(0.105)	(0.101)	(0.0932)	(0.101)	(0.186)
Non-Interest Income Share	2.057	3.665**	5.877***	3.681***	4.147***	0.799
	(3.360)	(1.826)	(1.211)	(1.242)	(1.537)	(2.450)
Ln(TA)*	-0.472	-0.597***	-0.833***	-0.528***	-0.669***	-0.0943
Non-Interest Income Share	(0.433)	(0.218)	(0.157)	(0.161)	(0.191)	(0.306)
Country characteristic*	0.0408**	-0.120**	-0.000179	0.487***	0.00637	2.85e-05***
Ln(TA)	(0.0161)	(0.0467)	(0.000163)	(0.0532)	(0.00402)	(6.04e-06)
Country characteristic*	0.554	0.623	-0.000528	0.712	-0.0249	0.000156*
Non-Interest Income Share	(0.449)	(1.347)	(0.00321)	(1.316)	(0.179)	(8.31e-05)
Country characteristic*Ln(TA)*	-0.0560	-0.0357	0.000102	-0.0952	0.0150	-2.38e-05**
Non-Interest Income Share	(0.0581)	(0.163)	(0.000459)	(0.171)	(0.0225)	(1.05e-05)
Activity Restrictions	-0.413***					
	(0.125)					
Herding		0.697*				
		(0.394)				
Deposit Insurance			0.00118			
			(0.00128)			
Crisis				-3.398***		
				(0.403)		
Real Interest Rate					-0.0655*	
					(0.0352)	
GDP per capita						-0.000201***
						(6.75e-05)
Constant	-6.171***	-2.984**	28.35***	24.88***	38.40***	-5.169***
	(0.844)	(1.188)	(5.146)	(5.603)	(6.034)	(0.881)
Observations	15,716	16,507	13,496	15,627	15,037	16,507
Adjusted R-squared	0.580	0.573	0.575	0.597	0.555	0.574
Bank Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixedd Effects	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
cluster	BANK	BANK	BANK	BANK	BANK	BANK
Nr Countries	73	76	49	64	70	76

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Marginal effects

Activity restrictions	Low		Median		High		High-Low	
Small banks	.459	.489	1.2	.004	1.941	.001	1.482	.123
Median bank	-.978	.045	-.583	.059	-.189	.646	.789	.23
Large banks	-3.273	0	-3.433	0	-3.592	0	-.319	.812
Large-Small	-3.732	.002	-4.633	0	-5.533	0		

Herding	Low		Median		High		High-Low	
Small banks	.601	.276	.879	.033	1.532	.076	.931	.409
Median bank	-.665	.076	-.435	.132	.106	.843	.771	.265
Large banks	-2.688	0	-2.534	0	-2.173	.031	.515	.668
Large-Small	-3.289	0	-3.413	0	-3.705	.017		

Deposit Insurance	Low		Median		High		High-Low	
Small banks	1.319	.003	1.319	.003	1.319	.003	0	.966
Median bank	-.398	.205	-.397	.206	-.395	.207	.003	.528
Large banks	-3.141	0	-3.14	0	-3.134	0	.008	.748
Large-Small	-4.46	0	-4.459	0	-4.453	0		

Crisis	No				Yes		Yes-No	
Small banks	.79	.072			.981	.071	.191	.692
Median bank	-.299	.318			-.304	.443	-.005	.988
Large banks	-2.039	.001			-2.358	.002	-.319	.637
Large-Small	-2.829	.001			-3.339	.001		

Real Interest Rate	Low		Median		High		High-Low	
Small banks	.46	.439	.754	.095	1.194	.041	.734	.344
Median bank	-.933	.012	-.479	.133	.198	.574	1.131	.002
Large banks	-3.158	0	-2.45	0	-1.393	.086	1.765	.054
Large-Small	-3.618	.001	-3.204	0	-2.587	.031		

GDP per Capita	Low		Median		High		High-Low	
Small banks	.309	.725	.523	.431	1.151	.013	.841	.397
Median bank	.065	.906	-.126	.762	-.687	.046	-.751	.245
Large banks	-.326	.756	-1.164	.14	-3.622	0	-3.297	.008
Large-Small	.635	.689	-.687	.157	-4.773	0	0	

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