

Global Banks and Systemic Risk: The Dark Side of Country Financial Connectedness

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Global financial integration

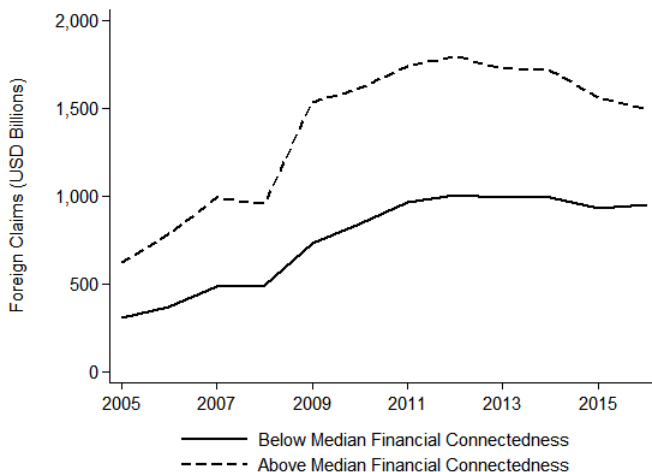
Countries have become more financially integrated:

- Capital markets liberalization, economic integration, technological advancements, and better institutions
- Long-term (e.g., FDI) and short-term (e.g., bank credit) cross-border capital flows have increased

There are costs and benefits:

- **Benefits:** risk-sharing, diversification, efficiency gains, economic growth (e.g., Bekaert et al. (2011))
- **Costs:** risk transmission, consumption volatility, business cycle synchronization (e.g., Kalemli-Ozcan et al. (2013))

Where are U.S. BHCs' foreign claims located?



This paper

Is the financial integration of U.S. banks' foreign exposure locations related to their contribution to US systemic risk?

- **Direct linkages:**

- Diminished ability to manage global liquidity
- Risk spillovers to the domestic market (e.g., Cetorelli and Goldberg (2012))

- **Common shocks and correlated risk-taking:**

- Decreases market segmentation and strengthens the co-movement of global BHCs' portfolios (e.g., Allen et al. (2012))

Related literature

- **International financial integration:**

- Economic growth and investment: Bekaert et al. (2005, 2011), Henry (2000)
- Global imbalances, crisis transmission, and output synchronization: Mendoza et al. (2019), Kalemli-Ozcan (2013a, 2013b)

- **Cross-country risk spillovers:**

- Stock market co-movement: Forbes and Rigobon (2002)
- Contagion: Allen and Gale (2000)
- Real state and credit markets: Peek and Rosengren (2000), Kaminsky and Reinhart (2000)

- **Risks of bank internationalization:**

- Some studies find that internationalization increases bank risk (Buch et al. (2013), Berger et al. (2017)), while others don't (Amihud et al. (2002))
- Idiosyncratic vs. systemic risk effects of internationalization (Ibrahimov et al. (2011))

Data

Data

BHCs' foreign claims: FFIEC 009 (country exposure reports)

- Foreign claims across countries for each BHC at the quarterly frequency (loans, bonds, etc.)
- Claims can be cross-border or local

Coverage: U.S. financial institutions with more than \$30 million of claims on foreign residents

Final sample: 26,925 bank-quarter-host country observations from 45 global BHCs with foreign claims on 41 countries during 2005:Q1-2016:Q4

- 78% of banking industry assets and 79% of U.S. financial institutions' foreign exposures in 2016:Q4

Data

Financial integration: variance decomposition of countries' stock market index return volatilities (Diebold and Yilmaz (2014))

- VAR model of daily range volatilities estimated over 150-day rolling windows
- Percent of country i 's future uncertainty due to shocks from other countries and vice-versa (*analogous to bilateral imports and exports*)

	x_1	x_2	...	x_N	From Others
x_1	d_{11}^H	d_{12}^H	$\cdots$	d_{1N}^H	$\sum_{j=1}^N d_{1j}^H, j \neq 1$
x_2	d_{21}^H	d_{22}^H	$\cdots$	d_{2N}^H	$\sum_{j=1}^N d_{2j}^H, j \neq 2$
$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\vdots$	$\vdots$
x_N	d_{N1}^H	d_{N2}^H	$\cdots$	d_{NN}^H	$\sum_{j=1}^N d_{Nj}^H, j \neq N$
To Others	$\sum_{\substack{i=1 \\ i \neq 1}}^N d_{i1}^H$	$\sum_{\substack{i=1 \\ i \neq 2}}^N d_{i2}^H$	$\cdots$	$\sum_{\substack{i=1 \\ i \neq N}}^N d_{iN}^H$	$\frac{1}{N} \sum_{\substack{i,j=1 \\ i \neq j}}^N d_{ij}^H$

Data

Systemic risk:

- Marginal expected shortfall (*MES*): *A BHC's sensitivity to a systemic event*, defined as (-1) times the average equity return during the worst five percent market return days in a given quarter (Acharya et al. (2016))
- ΔCoVaR : *a BHC's contribution to systemic risk*, defined as the difference between the CoVaR of the financial system given an institution is in distress and the CoVaR conditional on the median state of the institution (Adrian and Brunnermeier (2016))

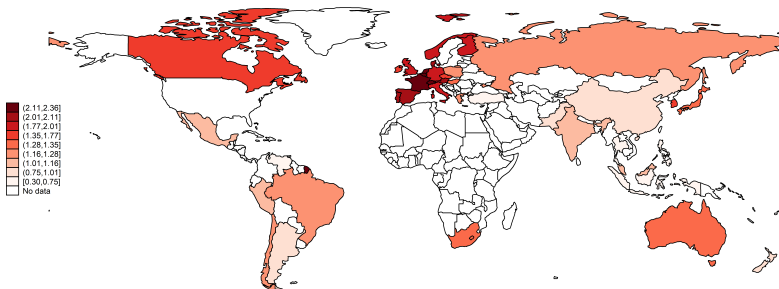
Other data: FR Y-9C (BHCs' financial statements), FRED (U.S. macroeconomic data), World Bank (country-level data)

U.S. BHC foreign claims by country

Country	Foreign Claims	Financial Connectedness
United Kingdom	431.572	2.041
Japan	238.336	0.893
Germany	141.547	2.210
France	132.741	2.283
Mexico	102.492	1.266
Canada	92.088	1.456
Netherlands	84.829	2.246
South Korea	84.253	0.984
Australia	81.548	0.874
Brazil	61.843	1.287
China	56.870	0.693
India	54.829	0.848
Ireland	52.492	1.491
Singapore	48.851	0.909
Hong Kong	46.864	0.968
Other	350.361	1.249

The top 15 countries include trading partners, financial centers, and emerging markets

Financial connectedness across countries



Europe is well integrated with global financial markets while South America and Asia are less so. But there is heterogeneity within developed and emerging markets

Empirical Results

Country financial connectedness and systemic risk

Hypothesis: *U.S. global banks with foreign claims in countries that are well connected to world financial markets have higher contribution to systemic risk*

Specification:

$$\text{Systemic Risk}_{i,t} = \alpha_i + \beta \text{FinConn}_{j,t-1} + \gamma W_{j,t-1} + \delta X_{i,t-1} + \zeta Z_{t-1} + \epsilon_{i,j,t}$$

- α_i denotes BHC fixed effects
- W is a vector of country controls: $\text{Ln}(\text{GDPPC})$, Credit-to-GDP , $\text{Ln}(\# \text{ of Listed Firms})$, $\text{Output Synchronization}$
- X is a vector of firm controls: $\text{Ln}(\text{Assets})$, Leverage , NII-to-IL , Deposits , $\text{Country Diversification}$, LLA , LCR
- Z denotes the CFNAI index
- Standard errors are clustered at the $\text{BHC} \times \text{quarter}$ and country levels
- Each country exposure within a BHC-quarter is weighted proportionately to the foreign claims a BHC has in a given country during a given quarter

Country financial connectedness and systemic risk

	MES		Δ CoVaR	
	(1)	(2)	(3)	(4)
Financial Connectedness	0.024*** (0.000)	0.008*** (0.000)	0.150*** (0.000)	0.059*** (0.001)
Controls	No	Yes	No	Yes
Observations	26,295	26,295	25,207	25,207
Adj. R2	.10	.57	.45	.75

- A one SD increase in *Financial Connectedness* is associated with a 5% increase in *MES* and a 2.3% increase in Δ CoVaR relative to their means

Endogeneity and reverse causality (1)

Concern 1: a systemic event in the U.S. may trigger higher volatility globally or omitted country-level factors may be driving the relation

Instruments:

- Capital controls should limit a country's financial integration (Forbes et al. (2016))
- FDI expropriation events deter capital flows (Lin et al. (2018), Azzimonti (2018))

	IV: Capital Controls 1975		IV: Neighbor Capital Controls 1975		IV: FDI Expropriation	
	MES	Δ CoVaR	MES	Δ CoVaR	MES	Δ CoVaR
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Connectedness	0.010*** (0.005)	0.031*** (0.002)	0.010*** (0.000)	0.069*** (0.000)	0.061*** (0.001)	0.449*** (0.000)
Observations	25,803	24,823	24,437	23,508	25,803	24,823
Adj. R2	.57	.73	.58	.73	.57	.75

Endogeneity and reverse causality (2)

Concern 2: the relation between financial connectedness and systemic risk may reflect BHCs' location choices

Lamont and Polk (2002) regressions:

- Concentrate in the component of changes in financial connectedness that is not related to BHC's location decisions
- For every bank i in quarter t , keep only countries to which the bank was exposed to in both quarter t and quarter $t-1$
- Estimate first-difference specifications of BHC systemic risk on financial connectedness

	MES	Δ CoVaR
	(1)	(2)
Δ Financial Connectedness	0.016** (0.026)	0.395*** (0.000)
Observations	25,063	24,018
Adj. R2	.06	.26

Endogeneity and reverse causality (3)

New market entries are another source of variation in bank's international portfolio financial connectedness

- Define market entries as events where U.S. banks' foreign claims change from zero to positive within a country-quarter pair
- *Post Entry* equals 1 for quarters following a new foreign market entry and 0 otherwise
- Use windows of 4, 8, and 12 quarters

	MES (-/+ 4Q)	Δ CoVaR (-/+ 4Q)	MES (-/+ 8Q)	Δ CoVaR (-/+ 8Q)	MES (-/+ 12Q)	Δ CoVaR (-/+ 12Q)
Post Entry $\times$ Financial Connectedness	0.007*** (0.004)	0.040*** (0.004)	0.005*** (0.004)	0.017** (0.030)	0.005*** (0.000)	0.016** (0.039)
Observations	2,177	2,177	2,118	2,118	2,029	2,029
Adj. R2	.83	.89	.88	.93	.92	.96

Decomposition by connectedness directionality

	MES			Δ CoVaR		
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Connectedness (Transmitted)	0.035*** (0.001)		0.049** (0.040)	0.280*** (0.000)		0.419*** (0.005)
Financial Connectedness (Received)		0.009*** (0.001)	-0.006 (0.390)		0.063*** (0.002)	-0.065 (0.116)
Observations	26,295	26,295	26,295	25,207	25,207	25,207
Adj. R2	.57	.57	.57	.75	.74	.75

Financial connectedness transmitted dominates in terms of economic and statistical significance

Decomposition by foreign claim types

	MES		Δ CoVaR	
	(1)	(2)	(3)	(4)
Cross-Border Claims $\times$ Financial Connectedness	0.004** (0.021)		0.030*** (0.007)	
Local Claims $\times$ Financial Connectedness	0.001 (0.304)		0.005 (0.488)	
Foreign Claims-Banks $\times$ Financial Connectedness		0.002** (0.048)		0.039*** (0.000)
Foreign Claims-Public $\times$ Financial Connectedness		0.001 (0.212)		−0.009* (0.081)
Foreign Claims-Non-Bank Private $\times$ Financial Connectedness		0.002*** (0.006)		0.048*** (0.000)
Observations	26,295	26,295	25,207	25,207
Adj. R2	.57	.58	.74	.74

- Indicator variable that equals 1 if a bank has positive claims (for a given type) in a country-quarter and 0 otherwise
- Relation is driven by cross-border exposures and exposures to banks and non-bank public entities

Bank characteristics

	MES			Δ CoVaR		
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Connectedness	0.004*** (0.007)	-0.001 (0.738)	0.010*** (0.001)	0.031** (0.013)	-0.025 (0.177)	0.070*** (0.000)
GSIB $\times$ Financial Connectedness	0.007*** (0.004)			0.066*** (0.000)		
Leverage $\times$ Financial Connectedness		0.001** (0.012)			0.007*** (0.001)	
Leverage	0.003* (0.052)	0.002 (0.151)	0.003* (0.059)	0.027*** (0.008)	0.017* (0.094)	0.015* (0.070)
LCR $\times$ Financial Connectedness			-0.004*** (0.005)			-0.024** (0.020)
LCR	-0.000 (0.997)	-0.000 (0.988)	0.001 (0.920)	0.025 (0.699)	0.024 (0.711)	-0.000 (0.996)
Observations	26,295	26,295	26,295	25,207	25,207	25,207
Adj. R2	.58	.58	.57	.73	.73	.75

- Bank systemic importance, leverage, and illiquidity amplify systemic risk

Transmission of foreign crises

- Is foreign crisis transmission amplified by financial integration?
- Are our results explained by domestic crises?

	MES				Δ CoVaR			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fin. Conn.	0.006*** (0.005)	0.005* (0.050)	0.005** (0.020)	0.004* (0.082)	0.047** (0.034)	0.041* (0.080)	0.036*** (0.005)	0.029** (0.028)
Fcrisis $\times$ Fin. Conn.		0.021*** (0.000)				0.142*** (0.000)		
Fcrisis	0.036*** (0.000)	0.020 (0.378)			0.262*** (0.002)	0.064 (0.758)		
GFC $\times$ Fin. Conn.				0.008 (0.194)				0.051 (0.192)
GFC			0.057*** (0.000)	0.043*** (0.002)			0.409*** (0.000)	0.321*** (0.000)
Observations	26,295	26,295	26,295	26,295	25,207	25,207	25,207	25,207
Adj. R2	.58	.58	.59	.59	.75	.75	.76	.76

Conclusion and policy implications

- We provide evidence of a significant risk externality associated with global banking exposures in countries that are well-connected to world financial market
- Results are generally aligned with regulatory frameworks aimed at managing cross-country connectedness and restricting cross-market shock transmission
- Our results also suggest that prudential regulation can improve financial system stability (e.g., through strong liquidity and capital standards)