

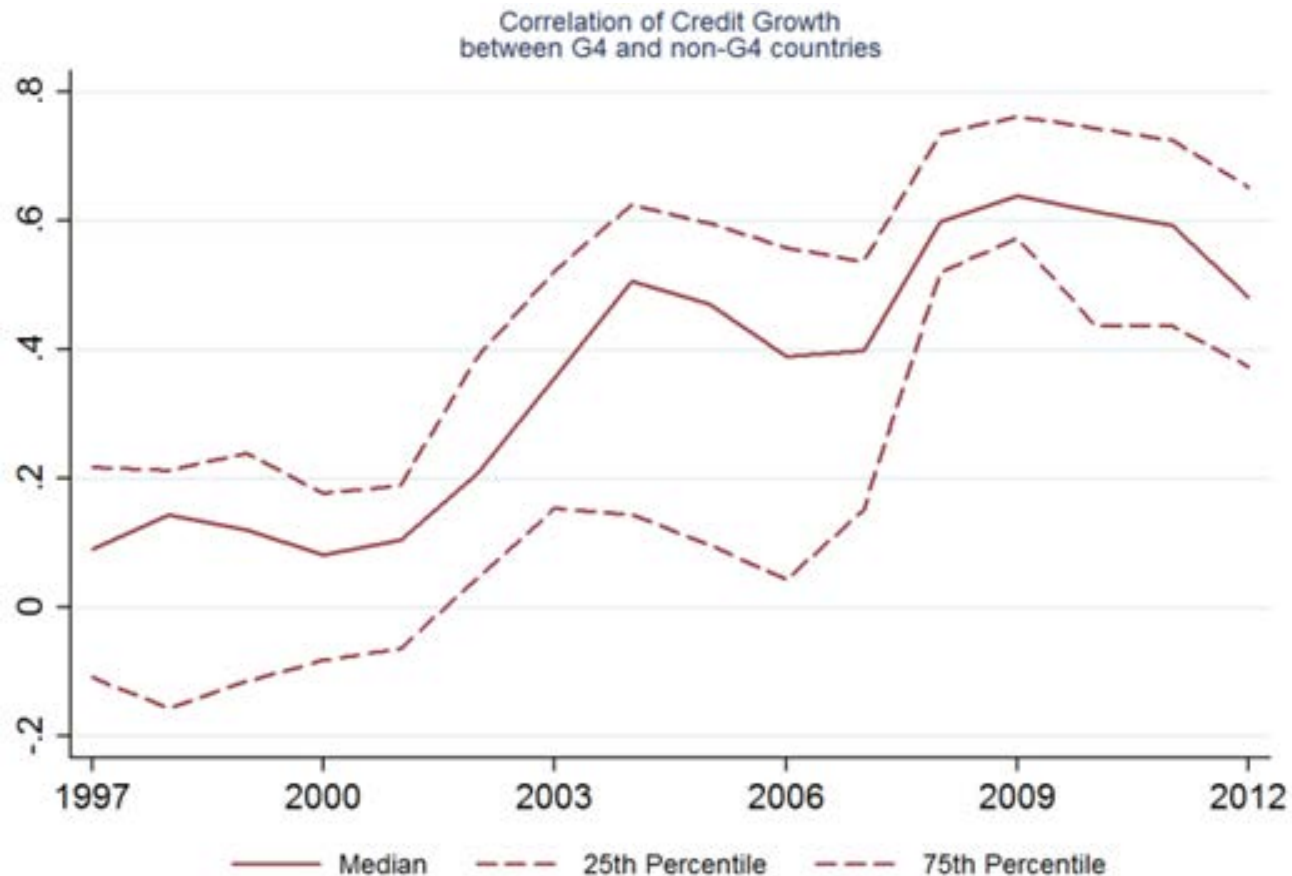
Global Liquidity and Drivers of Cross-Border bank Flows

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Does not represent views of IMF or FRB

Motivation

- The financial cycle is increasingly global

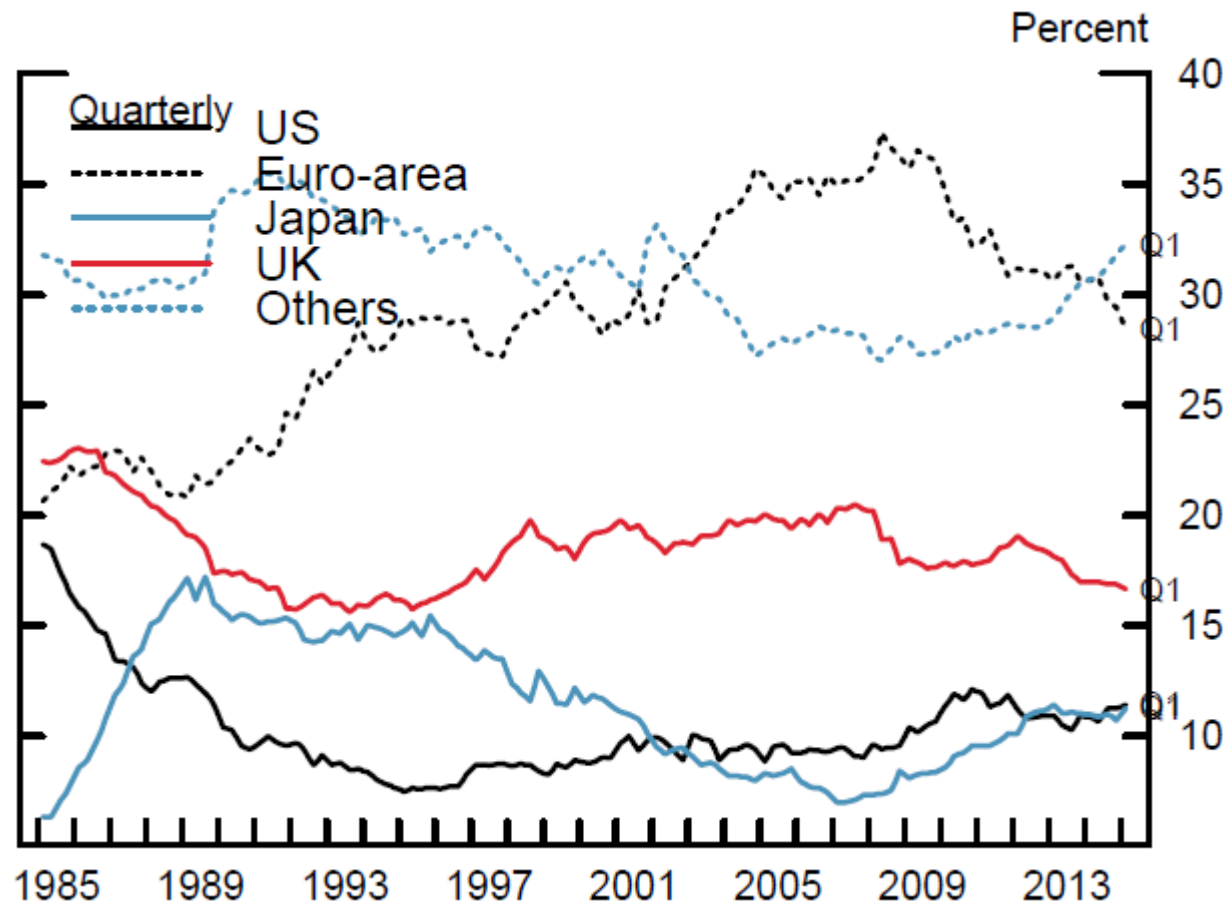


Motivation

- Much of cross-border flows originate in or are intermediated by “financial center” economies
 - Bank claims by US/UK/EA exceed claims on them by ~20%
 - Plus, a strong intermediation role
- GL = “factors of cross-border flows that relate to monetary and financial conditions in financial center economies”
- Literature focuses on US factors of cross-border flows
- But European banks important too

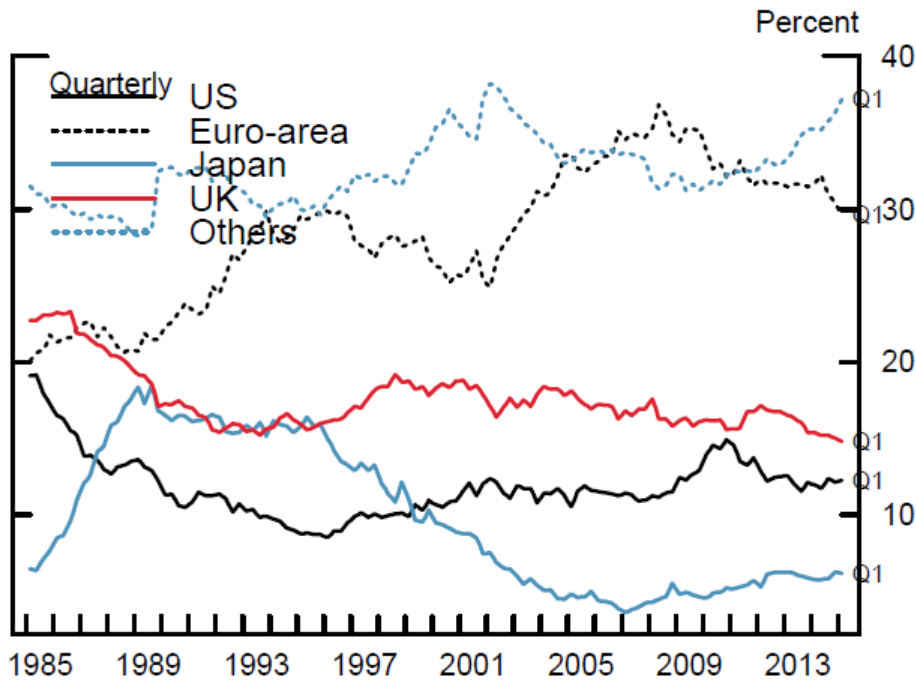
Motivation

- EA/UK share in global cross-border claims

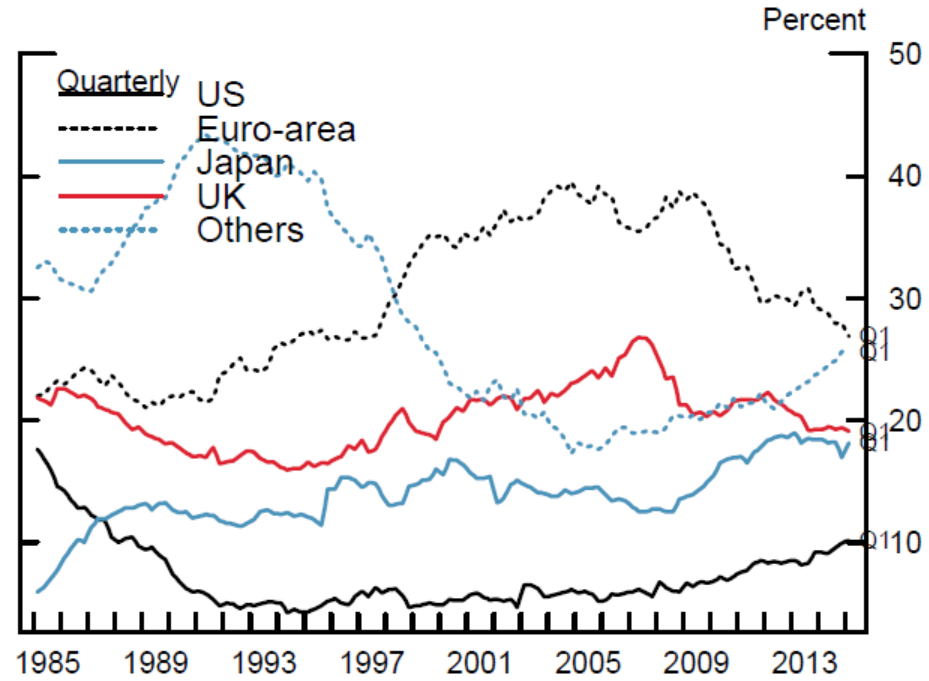


Motivation

- Claims on:
banks



- Claims on:
non-banks



Questions

- **EA/UK factors associated with global flows?**
- **Relative importance of EA/UK vs. US factors?**
- **Crisis vs. outside crisis?**

Method

- BIS IBS, locational data
- 1990-2014, 77 borrower countries, banks/non-banks, FX adj.
- Known US factors:
 - VIX (Bekaert et al., 2013, Rey, 2013)
 - TED spread, broker-dealer leverage (Bruno & Shin, 2015a)
 - Real rates, term spread
 - REER (Bruno and Shin 2015b, McCauley et al., 2015),
M2 growth
- **Replicate results for US on larger sample**
- **Check similar results for EA/UK and compare**

Preview of results

- Cross-border flows driven by:
 - **US monetary policy**
 - **EA/UK bank conditions**
 - Ted spread (often UK)
 - Leverage of large banks (often EA)
- **EA/UK banks especially important outside the crisis**
 - US bank variables often insignificant outside the crisis

US factors of cross-border flows, banks

Log Change in BIS Locational Cross-Border Claims on Banks

VARIABLES	1990-2014							1990-2014	1990-2014
VIX	-0.179*** (0.0270)							-0.00757 (0.0256)	-0.0394 (0.0240)
TED Spread	-1.891*** (0.388)							-1.475*** (0.366)	-1.306*** (0.374)
Bank Leverage	0.230*** (0.0340)							0.162*** (0.0341)	0.178*** (0.0358)
Slope of Yield Curve	-0.679*** (0.167)							-0.673*** (0.157)	
Real Fed Funds Rate	0.247*** (0.0926)								0.204* (0.115)
M2 growth	-0.499*** (0.108)							-0.272*** (0.0959)	-0.151 (0.105)
REER change	-0.274*** (0.0374)							-0.227*** (0.0321)	-0.229*** (0.0378)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,766	5,766	5,766	5,766	5,766	5,766	5,766	5,766	5,766
R-squared	0.026	0.020	0.030	0.017	0.015	0.022	0.026	0.050	0.048
Number of countries	77	77	77	77	77	77	77	77	77

- Controls: borrower GDP growth, inflation, IR differential.

US factors of cross-border flows, non-banks

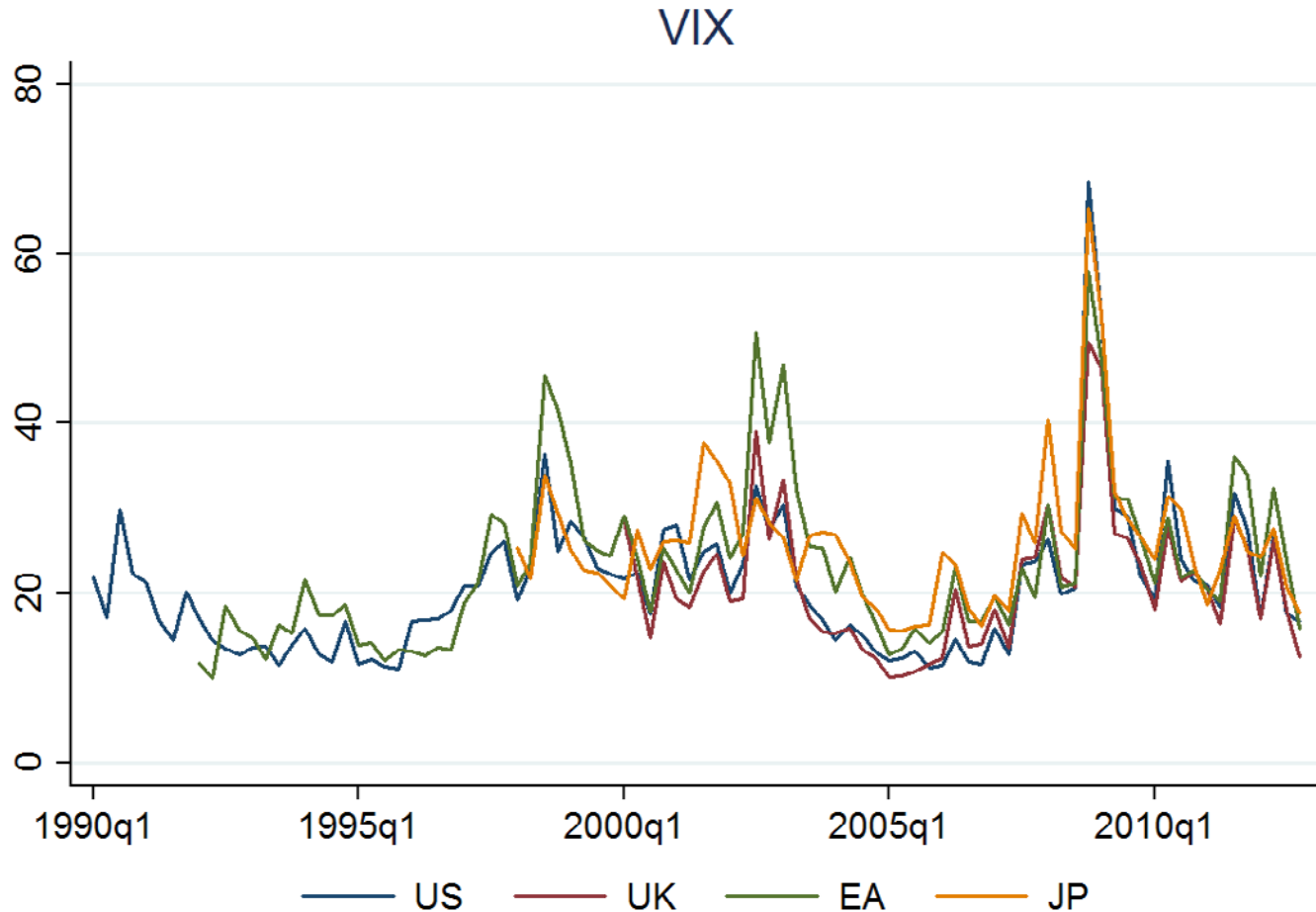
Log Change in BIS Locational Cross-Border Claims on *non-banks*

VARIABLES								1990-2014	1990-2014
VIX	-0.124***							-0.0387**	-0.0679***
	(0.0166)							(0.0154)	(0.0155)
TED Spread	-0.755***							-0.511**	-0.389
	(0.231)							(0.238)	(0.241)
Bank Leverage			0.167***					0.101***	0.109***
			(0.0249)					(0.0261)	(0.0276)
Slope of Yield Curve			-0.762***					-0.609***	
			(0.106)					(0.113)	
Real Fed Funds Rate					0.299***			0.226***	
					(0.0663)			(0.0775)	
M2 growth					-0.226***		-0.105*	0.0145	
					(0.0534)		(0.0526)	(0.0509)	
REER change							-0.124***	-0.107***	
							(0.0233)	(0.0222)	
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	
Observations	5,713	5,713	5,713	5,713	5,713	5,713	5,713	5,713	
R-squared	0.026	0.014	0.032	0.023	0.017	0.016	0.018	0.046	
Number of countries	77	77	77	77	77	77	77	77	

- Controls: borrower GDP growth, inflation, IR differential.

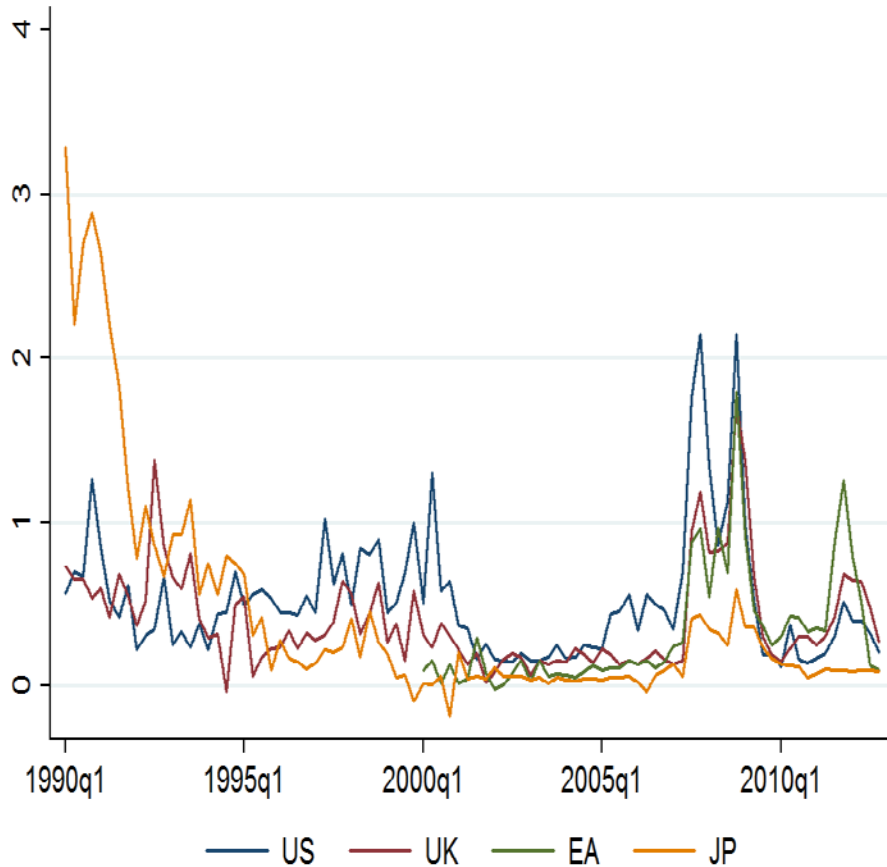
- Consider similar specification
- Use EA and UK variables
 - US leverage: broker dealers
 - EA/UK leverage: largest banks (SIFIs)
- Consider various time periods:
 - **2001-14 vs. 2001-06**
 - Also 1990-2000 and 2010-2014
- Compare statistical and economic significance

Some factors, e.g. VIX, highly correlated across US/EA/UK

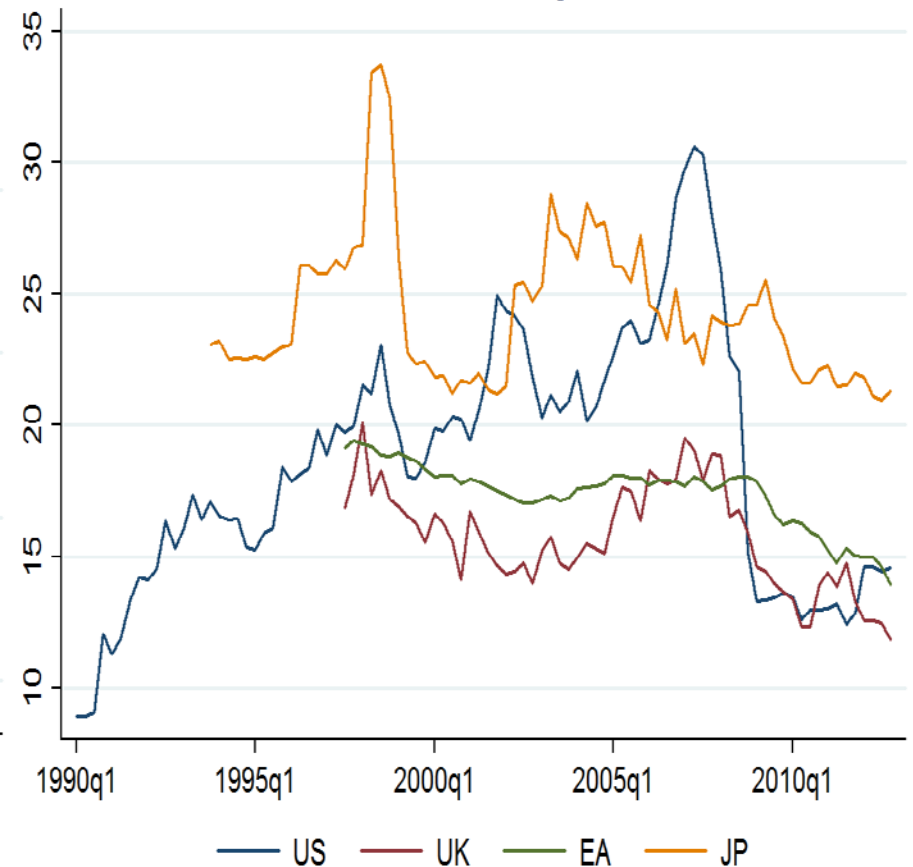


US/EA/UK bank conditions only modestly correlated

TED spread



Bank leverage



US, EA, UK factors of cross-border flows to banks

Log Change in BIS Locational Cross-Border Claims on Banks

	US				EA			UK	
VARIABLES	2001-14		2001-2006		2001-14	2001-06		2001-14	2001-06
VIX	0.0236 (0.0359)	-0.0454 (0.0337)	-0.0313 (0.0647)	-0.163* (0.0920)	0.0117 (0.0257)	0.0449 (0.0388)	0.0373 (0.0375)	0.0761 (0.0472)	0.0882 (0.0629)
TED Spread	-1.884*** (0.496)	-1.572*** (0.529)	-3.023 (2.169)	1.360 (3.721)	-13.32*** (1.689)	2.471 (5.031)	2.315 (4.851)	-6.375*** (1.030)	-6.009 (3.710)
Bank Leverage	0.0910* (0.0511)	0.0726 (0.0597)	-0.146 (0.164)	0.129 (0.319)	0.236* (0.125)	1.425** (0.544)	1.200** (0.568)	0.508*** (0.104)	0.439* (0.234)
Slope of Yield Curve	-1.250*** (0.304)		-0.940 (0.575)			1.179 (0.901)			0.498 (1.134)
Real interest rate		0.697*** (0.246)		-0.606 (1.024)	0.195 (0.253)		-0.772 (0.534)	-0.103 (0.166)	
M2 growth	-0.410** (0.161)	-0.289 (0.179)	-0.0359 (0.289)	-0.0770 (0.318)	0.195 (0.176)	-0.156 (0.483)	-0.250 (0.485)	0.178*** (0.0667)	0.332 (0.237)
REER change	-0.339*** (0.0616)	-0.374*** (0.0796)	-0.116 (0.136)	-0.0751 (0.140)	0.0508 (0.0556)	0.0360 (0.109)	0.0647 (0.109)	0.147** (0.0704)	-0.0621 (0.141)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,849	2,849	1,216	1,216	2,849	1,216	1,216	2,734	1,216
R-squared	0.059	0.058	0.013	0.012	0.055	0.017	0.017	0.066	0.018
Number of countries	58	58	55	55	58	55	55	58	55

Cross-border flows, 1990s and 2010-14, to banks

*Log Change in BIS Locational Cross-Border Claims on **Banks***

VARIABLES	1990-2000			2010-14			
	US	EA	UK	US	EA	UK	
VIX	-0.0337 (0.0737)			0.0376 (0.0715)	0.0133 (0.0769)	0.0166 (0.0650)	0.126 (0.0922)
TED Spread	-1.300 (1.404)	-0.223 (2.094)	-1.206** (0.594)	10.38 (9.605)	5.424 (9.030)	-10.37** (4.603)	-16.29*** (4.430)
Bank Leverage	0.195** (0.0768)	0.129 (0.309)	0.110 (0.130)	-0.452 (0.460)	-0.206 (0.544)	-0.242 (0.361)	2.476 (1.706)
Slope of Yield Curve					-0.217 (1.730)	1.768 (1.445)	
Real interest rate	0.434 (0.348)	-0.0239 (0.698)	-0.175 (0.316)	3.033** (1.316)			2.008 (2.008)
M2 growth	-0.285 (0.282)	-0.493* (0.286)	0.150** (0.0655)	0.208 (0.414)	-0.609* (0.306)	-0.565 (0.545)	-0.270 (0.272)
REER change	-0.0740 (0.0777)	0.00952 (0.0524)	0.0125 (0.0515)	-0.713*** (0.234)	-0.250* (0.147)	-0.150 (0.0911)	-0.0485 (0.319)
Country FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,340	1,251	1,340	995	995	995	880
R-squared	0.019	0.015	0.016	0.039	0.033	0.030	0.034
Number of countries	46	46	46	56	56	56	56

US, EA, UK factors of cross-border flows to non-banks

Log Change in BIS Locational Cross-Border Claims on Non-Banks

VARIABLES	US				EA			UK	
	2001-14		2001-06		2001-14	2001-06		2001-14	2001-06
VIX	-0.0298 (0.0271)	-0.0844*** (0.0227)	-0.0774 (0.0678)	-0.0945 (0.0595)	-0.0704*** (0.0213)	-0.0484 (0.0424)	-0.0412 (0.0410)	-0.0489 (0.0303)	-0.0211 (0.0573)
TED Spread	-0.452 (0.321)	-0.314 (0.311)	-0.917 (1.460)	-1.215 (2.196)	-5.165*** (0.910)	-4.201 (4.211)	-3.631 (4.198)	-1.906*** (0.488)	2.724 (2.166)
Bank Leverage	0.0860* (0.0430)	0.0274 (0.0441)	-0.0237 (0.0823)	-0.109 (0.178)	0.0236 (0.0816)	0.384 (0.333)	0.395 (0.372)	0.153** (0.0624)	0.440** (0.189)
Slope of Yield Curve	-0.989*** (0.281)		-1.088** (0.456)		-0.699 (0.678)				
Real interest rate	0.856*** (0.166)		0.949 (0.645)		0.441** (0.203)		0.0359 (0.416)		0.112 (0.120)
M2 growth	-0.363*** (0.0968)	-0.207** (0.0932)	-0.122 (0.190)	-0.429** (0.196)	0.299*** (0.106)	0.0567 (0.314)	0.197 (0.312)	0.188*** (0.0533)	0.223* (0.127)
REER change	-0.0796* (0.0415)	-0.162*** (0.0393)	-0.0306 (0.0818)	0.0291 (0.0740)	-0.0322 (0.0294)	0.0164 (0.0730)	-0.0192 (0.0602)	0.110** (0.0470)	0.199** (0.0967)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,823	2,823	1,190	1,190	2,823	1,190	1,190	2,708	1,190
R-squared	0.059	0.062	0.029	0.026	0.054	0.027	0.026	0.059	0.032
Number of countries	58	58	55	55	58	55	55	58	55

Cross-border flows, 1990s and 2010-14, to non-banks

Log Change in BIS Locational Cross-Border Claims on Non-Banks

VARIABLES	1990-2000			2010-14			
	US	EA	UK	US	EA	UK	
VIX	-0.0532 (0.0541)			-0.0678 (0.0439)	-0.0735* (0.0423)	-0.0698* (0.0408)	-0.0207 (0.0469)
TED Spread	1.282 (1.146)	0.0841 (1.690)	1.692 (1.518)	8.221* (4.845)	7.760 (4.866)	-0.795 (2.735)	-4.736* (2.469)
Bank Leverage	0.195** (0.0766)	0.0316 (0.238)	-0.143 (0.222)	0.165 (0.275)	0.154 (0.288)	0.0221 (0.391)	2.118*** (0.767)
Slope of Yield Curve			0.407 (0.270)		-0.300 (0.795)		
Real interest rate	0.00317 (0.236)	-0.103 (0.395)		0.354 (0.597)		-0.301 (0.772)	2.055* (1.054)
M2 growth	-0.0808 (0.157)	-0.290* (0.153)	-0.0924 (0.165)	-0.339 (0.258)	-0.460** (0.207)	-0.429 (0.412)	-0.173 (0.134)
REER change	-0.104 (0.0725)	-0.0190 (0.0305)	-0.0230 (0.0271)	-0.216* (0.112)	-0.178** (0.0686)	-0.0573 (0.0555)	-0.160 (0.137)
Country FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,315	1,226	1,315	995	995	995	880
R-squared	0.019	0.012	0.013	0.021	0.021	0.007	0.013
Number of countries	45	45	45	56	56	56	56

Preliminary summary

- In 1990s, US bank conditions most important
- In 2000s, not robust to excluding financial crisis

- EA/UK bank conditions gain importance in 2000s
Robust to excluding financial crisis

- US monetary policy important

Comparison US vs EA/UK univariate, banks

Log Change in BIS Locational Cross-Border Claims on Banks

		2001-14		2001-06		2010-14	
		TED	Bank leverage	TED	Bank leverage	TED	Bank leverage
US	Coefficient	-2.193***	0.252***	-2.684**	0.131	-5.006	-0.743***
	Std. error	(0.482)	(0.0470)	(1.188)	(0.123)	(4.777)	(0.225)
	R2	0.015	0.026	0.008	0.005	0.002	0.009
UK	Coefficient	-4.738***	0.110*	-6.847**	0.544***	-6.578***	0.856***
	Std. error	(0.607)	(0.0646)	(2.772)	(0.139)	(2.020)	(0.306)
	R2	0.040	0.007	0.010	0.012	0.011	0.006
EA	Coefficient	-12.29***	0.391***	-5.288	0.806***	-11.72**	0.689**
	Std. error	(1.525)	(0.107)	(3.408)	(0.196)	(4.445)	(0.262)
	R2	0.041	0.012	0.006	0.012	0.012	0.006

Comparison US vs EA/UK univariate, non-banks

*Log Change in BIS Locational Cross-Border Claims on **Non-Banks***

		2001-14		2001-06		2010-14	
		TED	Bank leverage	TED	Bank leverage	TED	Bank leverage
US	Coefficient	-0.848***	0.192***	-0.532	0.261***	-0.645	-0.102
	Std. error	(0.301)	(0.0361)	(0.700)	(0.0722)	(2.719)	(0.143)
	R2	0.014	0.038	0.003	0.008	0.000	0.001
UK	Coefficient	-2.431***	0.0743	-1.011	0.565***	-1.101	0.311*
	Std. error	(0.385)	(0.0450)	(1.536)	(0.119)	(1.113)	(0.181)
	R2	0.032	0.013	0.003	0.020	0.001	0.002
EA	Coefficient	-6.350***	0.314***	-10.82***	0.841***	-1.842	0.173
	Std. error	(0.879)	(0.0802)	(2.967)	(0.172)	(2.101)	(0.154)
	R2	0.033	0.020	0.017	0.021	0.001	0.001

Comparison US vs EA/UK multivariate, banks

- Check all country combinations (US/EA/UK) of TED, bank leverage, and real rate/term spread
- Sort by R2

Banks

1990-2014	Real rate	TED	Leverage	R2	R2 difference
1	US	UK	EA	0.052	+10%
...					
25	US	US	US	0.049	

2001-06	Real rate	TED	Leverage	R2	R2 difference
1	US	UK	EA	0.017	+20-30%
...					
22	US spread	US	US	0.014	
54	US	US	US	0.012	

Comparison US vs EA/UK multivariate, non-banks

- Check all country combinations (US/EA/UK) of real rate, bank leverage, and real rate/term spread
- Sort by R2

Non-banks

1990-2014	Real rate	TED	Leverage	R2	R2 difference
1	US	UK	US	0.046	+0%
...					
3	US	US	US	0.046	

2001-06	Real rate	TED	Leverage	R2	R2 difference
1	UK	EA	US	0.031	+10%
2	UK	EA	EA	0.031	
...					
26	US	US	US	0.027	

Summary

- GL = “factors of cross-border flows that relate to monetary & financial conditions in financial center economies”
- **GL driven by**
 - **US monetary factors**
 - **EA/UK bank conditions**
- EA/UK banks especially important in 2000s, also outside the crisis